

MINING WORLD



in this issue
**WORLD'S FASTEST
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Page 34

JUNE, 1951

Vol. 13

No. 7

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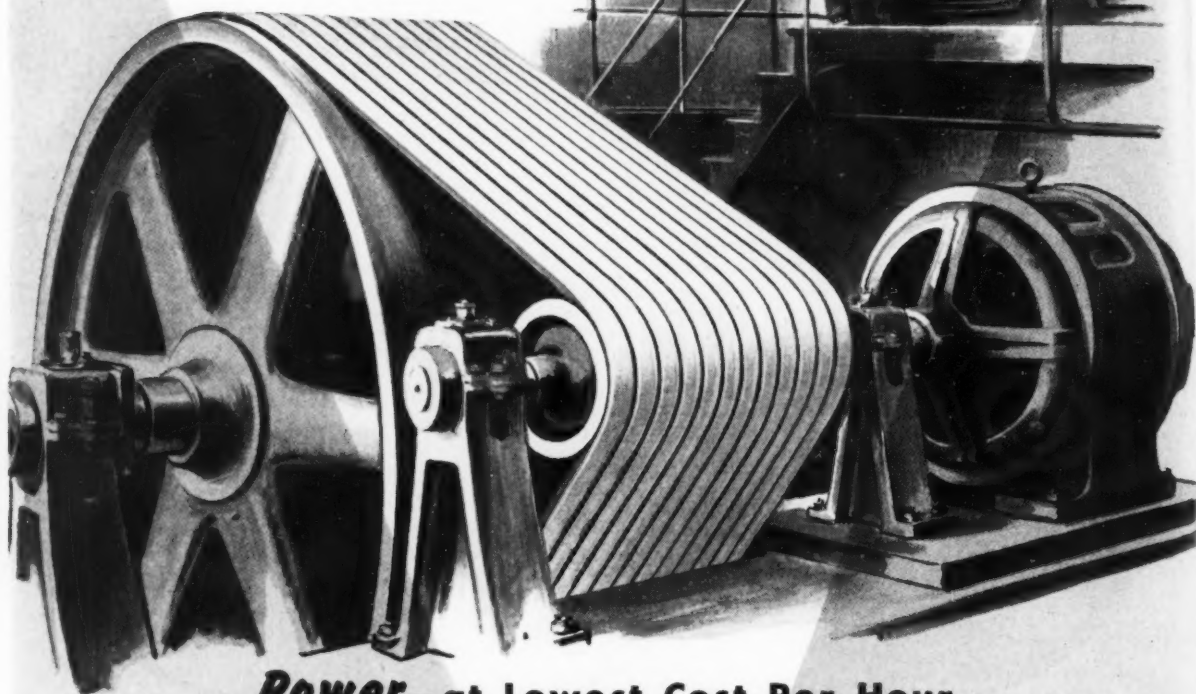
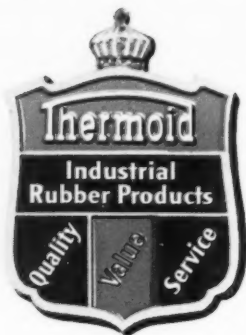


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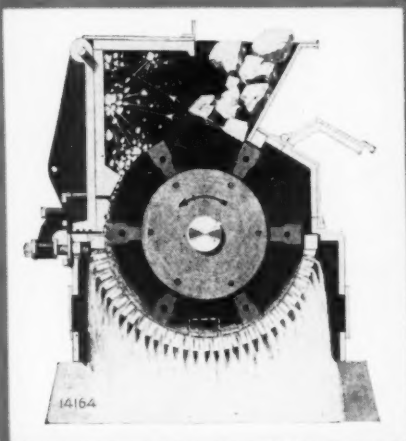
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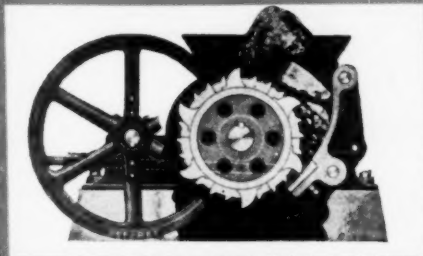
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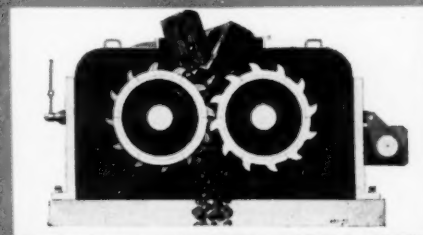
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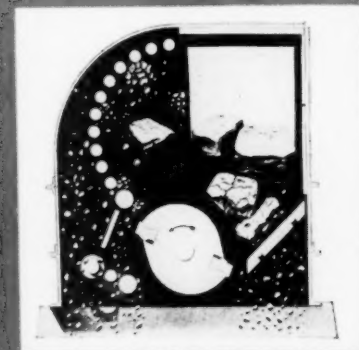
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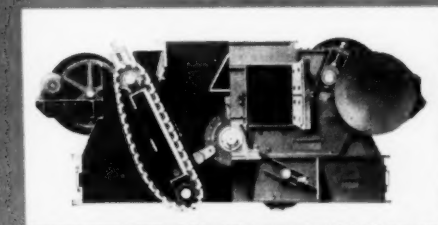
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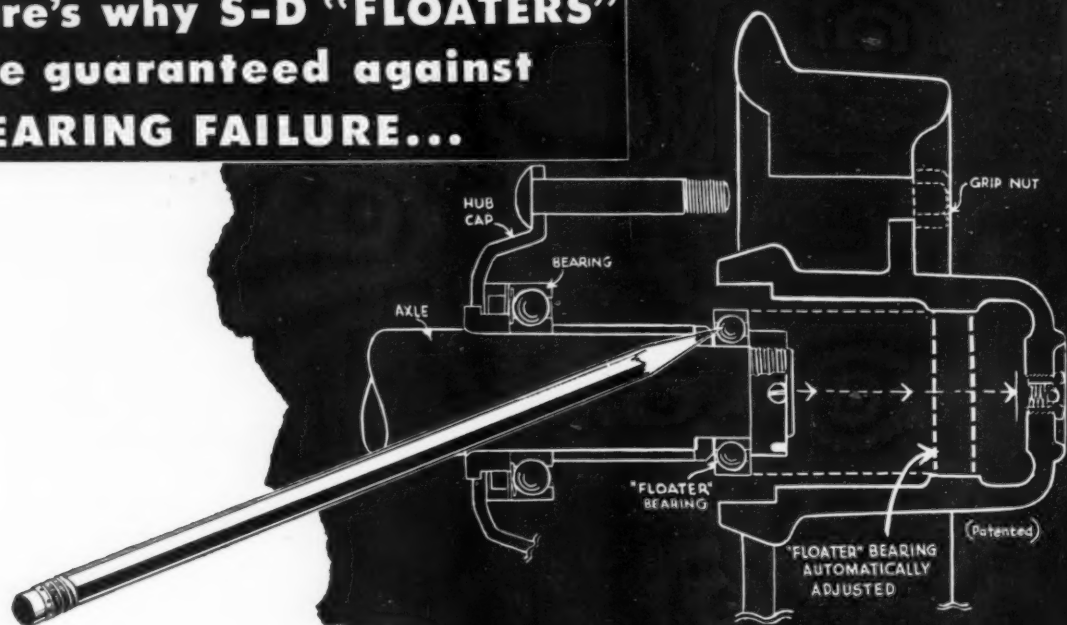
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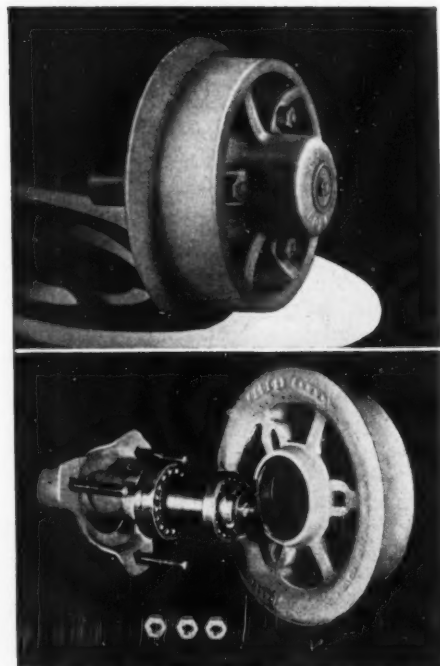
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A Miller Freeman Publication

Published monthly except in April when publication is semi-monthly

JUNE, 1951

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DRIFTS AND CROSSCUTS

The Man of the Month in Mining

Mining World's new cover featuring the month's most significant event in the mineral industries has been enthusiastically received by mining men in all parts of the world.

The April cover featured one phase of the winter operations of the Oliver Iron Mining Company, one of the world's largest and most important mining companies. The cover for May featured the Yellow Pine antimony smelter of the Bradley Mining Company, the largest domestic antimony producer, and one of the outstanding strategic-metal mining, milling, smelting and refining companies.

Following the appearance of the first two issues with the new cover a great deal of interest has been aroused as to what man would be the first to appear on a cover. Mining World has received many suggestions as to the man to be so honored.

When the report came from Johannesburg, Union of South Africa, that a new world's record for shaft sinking had been established there was no doubt as to the ability of the man who planned and directed the record sinking program. Without question the honor of being the first individual to appear on the cover goes to that man—T. F. Muller, manager, Virginia Orange Free State Gold Mining Company, Limited, Virginia Orange Free State, South Africa. For a report on the new record—504 feet in 30 days of April—and the men under Muller's supervision, Gordon de Villiers, underground manager, and Martin Tucker, master-sinker, who made the record, see page 34.

PEP Card—New Form

Those readers who couldn't find a PEP card in the May issue of Mining World can relax. There was no card in their magazine. To get the latest information on equipment and methods they can use the new type of coupon on page 70 of this magazine.

Hundreds of readers have already found that this is the easiest method for them to keep abreast of the latest equipment developments. Such knowledge is of particular importance in view of the need to maintain and in many instances to increase production at a time when fewer skilled men are available.

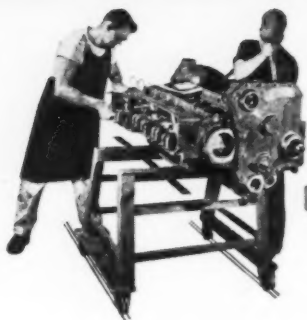
In the 30 days following publication of the first PEP card in the April issue, requests for information were received from readers in 30 states and the Territory of Alaska. The first card received from a foreign country was mailed in Canada. Cards have been postmarked from three Canadian provinces, five Mexican states, two English counties and from Japan, Norway, Spain, Sweden, France and Colombia. The card from Trondheim, Norway, holds the record for the longest distance travelled for the time being. G.O.A., Jr.

COMING CONVENTIONS

July 9, 10 and 11, 1951. IDAHO MINING ASSOCIATION, Sun Valley, Idaho.

October 28 through 31, 1951. Third Congress of the PAN AMERICAN INSTITUTE OF MINING ENGINEERING AND GEOLOGY with a joint meeting of the Geologic Society of America, the Society of Economic Geologists and the American Institute of Mining Engineers. Mexico City, Mexico.

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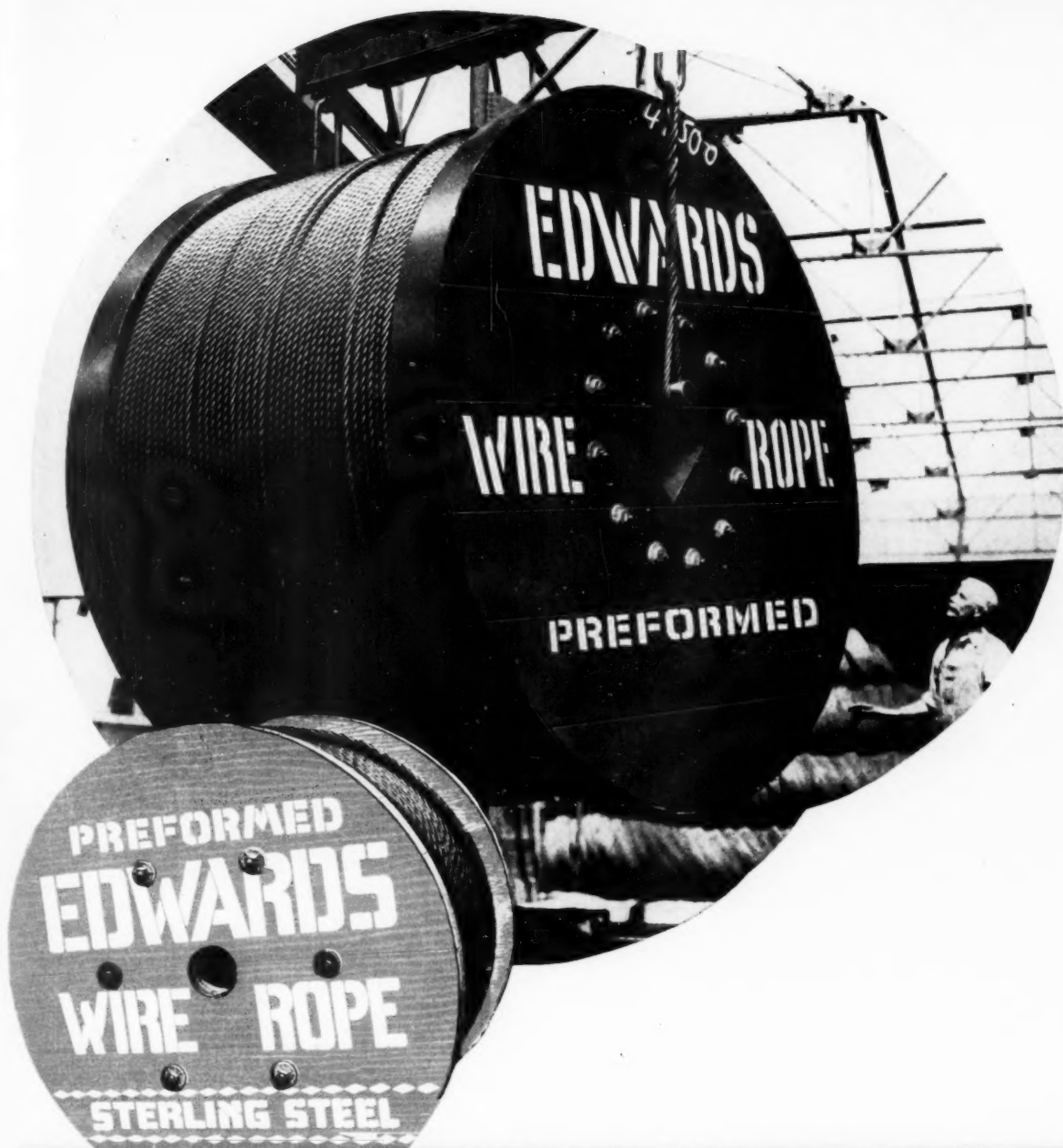
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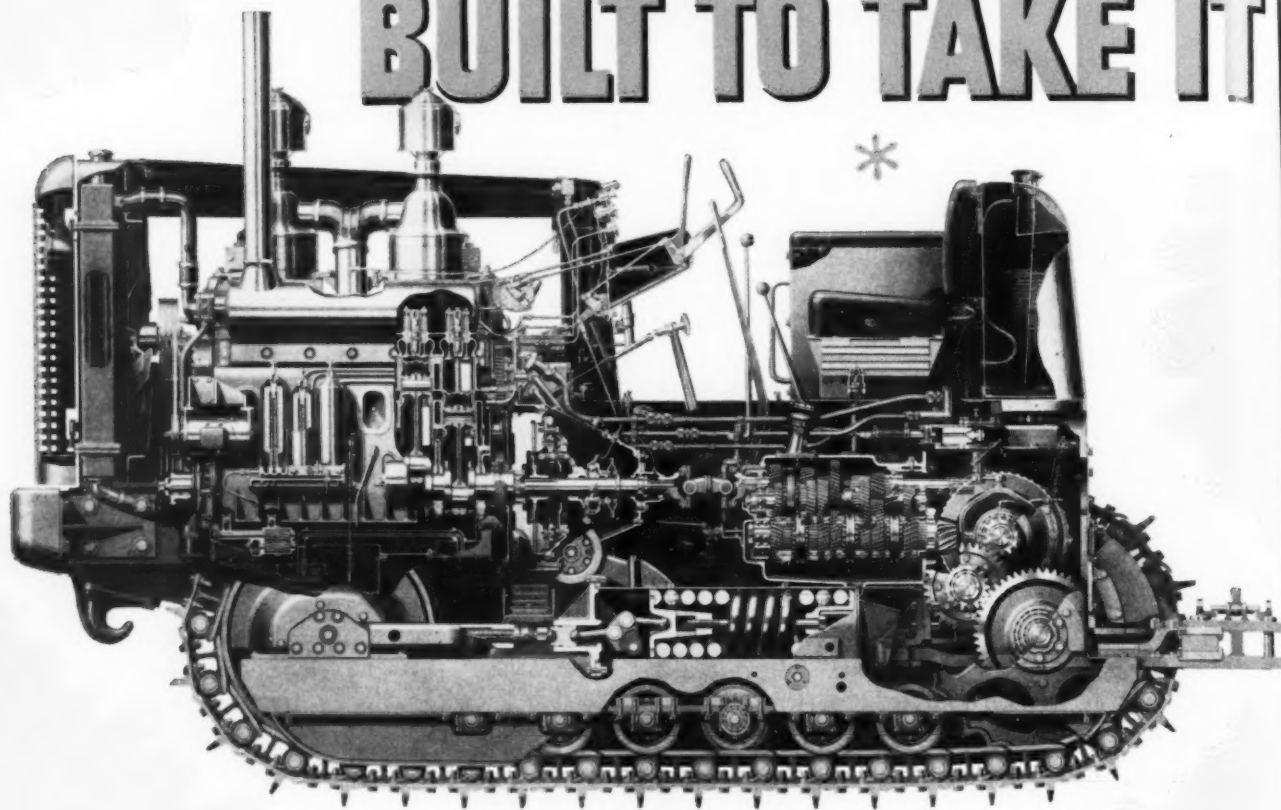
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CAPITOL CONCENTRATES

Tungsten Miners To Take Part In Federal Program Must Notify GSA

All tungsten miners and those miners desiring to mine tungsten and sell it to the government for the next five years at a guaranteed minimum price of \$63.00 per short ton unit must notify the nearest office of the General Services Administration office by July 1, 1951. Notification may be made by mail, or telegram and may be as simple as this: "I want to join in the Government's program and will prospect for or produce tungsten," with name and address added. Notification must be made to the nearest office listed below for the respective states.

Building 1-C, Denver Federal Center, Denver, Colorado; Colorado, Wyoming, Utah, New Mexico.

630 Sansome Street, San Francisco 11, California; California, Arizona, Nevada, Territory of Hawaii.

U.S. Courthouse, Seattle 4, Washington; Washington, Oregon, Idaho, Montana, Territory of Alaska.

2000 Fidelity Building, 911 Walnut Street, Kansas City, Missouri; Missouri, Kansas, Iowa, Nebraska, North Dakota, South Dakota, Minnesota.

1114 Commerce Street, Dallas 2, Texas; Texas, Louisiana, Arkansas, Oklahoma.

• RFC Was Real Friend To Mining

Now that mining men are up against DMA, they must admit that RFC was probably the best friend mining had during the last war. It is a case of not realizing how good your friends are until you have lost them. After Section 14 of the RFC Act was repealed by the 81st Congress and the section under which the most liberal mining loans were made expired, the mining industry realized what it meant to deal with an agency which was inclined to be as liberal as the law allowed, and what it meant to lose those loans.

The inept and totally inadequate programs of DPA and DMA generated the comment heard the other day to the effect that Stalin, himself, could not have devised more confusing ways to inhibit production of metals and minerals. The same comment goes for OPS.

• Exploration Fund Cut in Half

The much-advertised exploration fund of \$10,000,000 with which Defense Minerals was going to do so much (and which, it had been stated, was definitely segregated for the purpose) has shrunk to \$5,000,000. By an order dated April 13, the President cut the amount in half. This shows either an attempt to conserve money in the wrong place, or is an admission that no one wants the money on the advertised terms. Under any circumstances it is a beggarly performance!

• What Is "Grubstaking?"

One of the most curious statements to come out of a government agency since the famous "brass mine" episode during OPA days is that attributed to Dr. James Boyd relating to the new DMA exploration program.

"This exploration program," said Dr. Boyd, "is more liberal than the once-famous western system of 'grubstaking.' Under the old-fashioned method of grubstaking, those providing the 'grub' or finances to a prospector

expected to share in the profits of successful ventures. Under this exploration plan, the government can only recover its share of the costs. . . ."

Since when was putting up 50 percent of the cash termed "grub-staking?"

• President Truman Endorses Subsidies

In his April 26 message to Congress the President came out for subsidies or incentive payments on the basis that "such differential subsidies were used very successfully in World War II, and saved American consumers and taxpayers many millions of dollars, because it was much cheaper to subsidize some high-cost producers than to raise prices on the entire production of the commodities affected."

In August, 1947, President Truman said, "No adequate reason is apparent for continuing to subsidize the output of copper, lead and zinc; and even less reason exists for adding to the list of subsidized commodities." This was his comment when he vetoed the Allen incentive-payments bill to extend the premium price plan.

How much better hindsight is than foresight is also shown by the President's comments at that time on zinc, "If the plan were restored the great bulk of subsidy payments, in fact, would continue to go for high-cost production of zinc, the supply of which is becoming relatively ample."

• Paragraph Was Omitted

A little matter which did not appear in the DMA press release on Administrator Boyd's mine exploration program will make the western mining lawyers chuckle. Read it and weep: "All facilities, buildings, fixtures, equipment, or other items costing more than \$50 each, paid for or purchased with funds contributed jointly by the operator and the government, shall belong to the operator and the government jointly, in proportion to their respective contributions, and upon the termination of the contract, if they have any salvage value, shall be disposed of for their joint account unless the government, in writing, waives its interest in any such items. The government may require the dismantling, severance from land, and removal of any such items in order to realize its interest in the salvage value thereof, and the cost of any such removal and of the disposal of the items shall be for the joint account of the parties in proportion to their respective interests."

• Chrome Program Will Cause Confusion

John Davis Morgan is a young Ph.D. who won his laurels by putting together a scissors-and-pastepot book about the Minerals Industry in World War II. The volume was printed by National Security Resources Board and hence takes on a quasi-official cast. Many of Morgan's personal comments have been described as "wretched rubbish," but the effort landed him the post as one of DPA's chief policy makers on the subject of metals and minerals, as the House mining subcommittee discovered.

During the questioning it was brought out that a government program on chrome was in the works. It now has been published as a purchase program for five years, during which the government will buy on the basis of \$115.00 per ton for 48 percent based at Grants

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Metallurgy never has been—and never will be—a static science. Year after year, new reagents and processes and new combinations of older reagents and methods tend to obsolete many time-honored beneficiation practices.

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Pass, Oregon. It is a safe bet that when this schedule is translated into low-grade ores the price, for example, will be below the figure at which the Montana chromite can be produced. And separate schedules for various parts of the country will cause confusion and dissatisfaction.

• Serial Numbers Are Required

Much of the routine which mineral producers had to go through in World War II is being repeated—with flourishes and variations. The latest chapter is DMA's MO-7. It requires mines, mills and smelters to apply for serial numbers or do without priorities or other help. Where gold mines will rate in this picture remains to be seen.

In order to get a serial number the producer must file form MF-100 not later than June 30, 1951. It is a more complicated form than was necessary to obtain such a number during the war. Foreign producers also may file for serial numbers on the same form.

Gradually all phases of mining are coming under the control of the Defense Minerals Administration. The question is, will the controls be used to benefit domestic mining?

• Mineral Industry Coordination Needed

On April 7, 1951 the Commerce Department issued a revised list of essential activities, including mining of various ores and metals, to serve as a guide for deferment of individuals for military services. The metal and nonmetallic mining and milling of some 40 minerals were considered essential. The list did not include corundum, industrial diamonds, talc (steatite) and quartz crystals, (piezo-electric). Almost simultaneously the Defense Minerals Administration's Dr. Boyd, administrator, announced that among others, the above-listed minerals were vitally needed and the government would contribute 90 percent of the cost of approved exploration projects for them. Who would want even to apply for assistance knowing that mining of these minerals is not considered essential. More correlation and coordination is needed in top governmental levels and less junketing to explain why DMA has done so little.

• New Impetus Given Inflation Spiral

It is very strange that DPA and DMA do not want copper badly enough to pay over-market prices to United States marginal producers, yet agree to pay three cents a pound over the market for Chilean copper in an arrangement which the Chilean Minister of Economy terms "highly satisfactory."

Rumors fly thick and fast that the domestic copper ceiling will be raised to meet the world price on the naive assumption that the price will stay where it is and more copper will flow into the U.S. Instead, the big domestic producers will be given a price they do not want, a price insufficient to bring in most marginal copper mines will be set, and the consumers of copper products (including the defense effort) will suffer and pay dearly for the lack of an incentive payment system. Of such stuff are inflationary spirals made!

• Lead Stockpiling Is Suspended

The cessation of lead buying for the stockpile is not due to an attempt to relieve the market, according to the Munitions Board. The stockpile objective on lead is supposed to have been met. However, whether this target is the minimum or maximum objective is not stated (and there is a great difference). Or maybe the objective was lowered to equal the amount in the stockpile. One can do mysterious things with statistics!

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Power shovel loading blasted copper ore in the Chuquicamata, Chile, open pit mine of the Chile Exploration Company, an Anaconda subsidiary.

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Drilling in the room and pillar open-stopes is done with light equipment. Dell Hamill, miner, is drilling a hole with a Gardner Denver S48 mounted on a Jackleg. Steel is one-inch hexagonal with Liddicoat L2 single-use bits.

WISCONSIN ZINC-LEAD REVIVAL

Calumet and Hecla has developed a new mine using Diesels underground and has built and is operating a 1,200-ton mill

Calumet & Hecla Consolidated Copper Company, one of the oldest and best known names in the copper mining industry, is now operating a lead-zinc mine which it developed from scratch. Known as the Calumet & Hecla Consolidated Copper Company, Wisconsin Branch, the property is located about 3½ miles southwest of Shullsburg, Wisconsin.

The upper Mississippi Valley zinc-lead district, or as it is more generally known, the Northern Illinois-Southern Wisconsin district, has shown the most active development of any single non-ferrous mining area in the United States since the end of the war. Since 1944 three operators from outside the district have developed new mines and built milling plants. The one oldtime operator in the area has developed a new orebody and built a new mill.

Most operators will be interested in this description of the C&H property because it outlines the problems of the district and shows how they were met to establish a small but smooth and efficient operation. The more interesting points include the employment of Diesel-powered loading and haulage equipment underground to cut costs; the use of skips for hoisting for a short lift that would normally be handled with "cans"; and coping with a serious water problem because the orebodies are below the level of the water table of the area.

Whole District is Rejuvenated

Lead was being mined by the Indians of this area at the time the first white explorers arrived. The district is pockmarked with hundreds of small pits, where shallow deposits of lead carbonate and galena occurred and were widely exploited through the years. Between 1820 and 1865 an output of about 400,000 short tons made the area the largest lead producer in the world. Total production, prior to 1945, totaled 767,000 tons of lead and about 1,000,000 tons of zinc.

During World War II the district was the subject of considerable study by the U. S. Geological Survey and the U. S. Bureau of Mines. This work is continuing. Based largely on the findings of the two government departments, the Tri-State Zinc Company developed its operation five miles south of Galena, Illinois; and the Eagle-Picher Mining and Smelting Company acquired a group of leases north of Galena which have been developed and are currently producing.

It was early in 1947 that C&H entered the district; and, following studies of all available information by the local exploration staff, the company leased and drilled several areas. The largest of these is the block south of Shullsburg on which four good orebodies were developed. Two are now being mined.

Formation Like Tri-State

Orebodies throughout the district are shallow, flat-lying, sulphide replacements that are similar to the deposits found in the Tri-State district or the eastern Missouri lead belt. Rocks cropping out on the surface are Ordovician and Silurian in age. The regional dip of the formations is southwesterly at about 25 feet to the mile. The dip is not uniform, for the formations gently roll up and down forming structural troughs and crests which meander through the district. The ore deposits are located along the flanks of these troughs. Currently the economic interests of the district are centered in the Platteville, Decorah, and Galena formation of Ordovician age.

The total thickness of the Ordovician section as exposed in drill holes is about 430 feet. The Maquoketa shale averages about 100 feet thick, the Galena dolomite is about 220 feet, the Decorah limestone about 30 feet, and the Platteville limestone about 80 feet. The zone favorable to the occurrence of large zinc deposits is about 100 feet thick extending from the center of the Platteville formation through the Decorah and into the lower part of the Galena formation. The exploratory program carried forward by C&H involved drilling on nearly 12,000 acres of land leased from some 60 landowners. Leases on 4,000 acres

have been terminated with about 8,000 acres being held for mining and future development.

A drilling program was designed to locate ore and outline the orebodies both horizontally and vertically. The character and nature of the orebodies of the area are such that a vertical drill hole presents the only true picture of grade and continuity. The procedure followed was to drill two rows of holes 660 feet ($\frac{1}{8}$ th mile) apart, north and south, and 1,320 feet ($\frac{1}{4}$ th mile) apart east and west. This spacing takes into consideration the legal subdivision of the land and reduces crop damage to a minimum. Upon encountering ore, the drilling pattern was changed. Holes were spaced 50 to 100 feet apart, depending upon the apparent width of the orebody, to outline the thickness, width and length of the deposit. The program totaled 175,000 feet of churn and core drilled holes in 682 different locations.

Fully Planned Development

Opening an entirely undeveloped area in which the orebodies had been rather well defined by drilling offered several advantages. A complete mining system could be planned in advance, and the shaft sunk and the principal haulage ways driven so as to provide maximum efficiency and a minimum of bottlenecks. There was no opportunity to be tempted to use abandoned workings in order to save development costs and later find that operating costs more than offset any initial savings effected.

The shaft, deepest in the area, is 6 by 16 feet and is 354 feet deep. It contains two hoisting compartments and a manway. The haulage level is at 330 feet, with the remaining



LEFT: John Lasio, resident manager, dressed in waterproof "diggers" after his morning trip through the mine. CENTER: George L. Sullivan, mill superintendent, in his office. RIGHT: R. W. Kliebenstein, mine engineer, at his drawing board in the engineering office after an underground check on development work.

depth being used for a skip loading pocket and sump. At the shaft station, the crosscuts trend north to the Hayden and Kittoe leases and south to the Gensler lease. These three leases contain all of the four orebodies developed to date. The crosscuts are 11 by 18 feet in cross section.

The development drifting technique was conventional but fast and efficient. An 11 by 11 foot face (for a pilot drift) was drilled with thirty-five $7\frac{1}{2}$ foot deep holes. The pattern contained a six-hole burn cut. Equipment used included a Cleveland jumbo mounting Gardner-Denver Company A79 drifters on aluminum shells. Drifters were automatic feed chucked for one-inch hexagonal steel with $1\frac{3}{4}$ -inch Liddicoat bits. To change the size of bit for the full $7\frac{1}{2}$ feet of depth was not necessary.

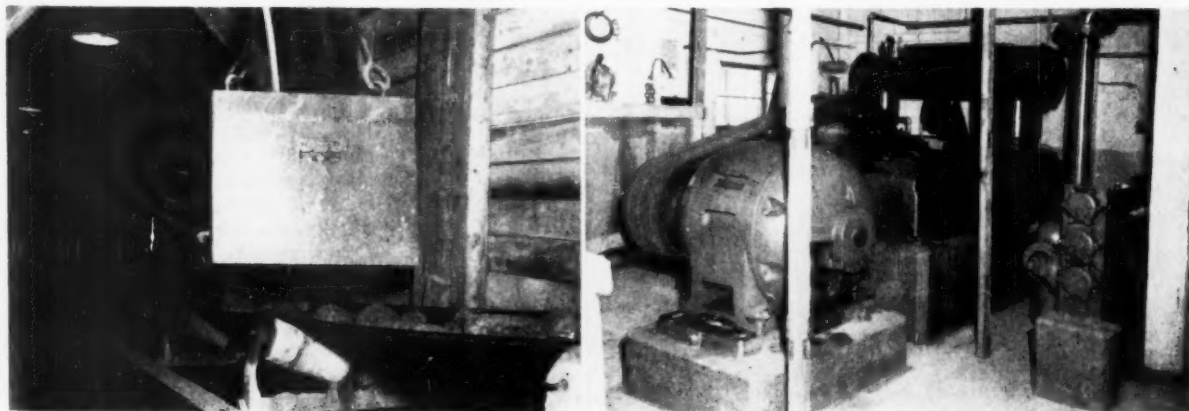
The six holes of the burn cut were loaded to the collar, and each of the remaining holes were loaded with six sticks of $1\frac{1}{2}$ -inch, 40 percent, Atlas gelatin powder. Rounds

were fired with standard-delay electric blasting caps, and about seven feet were pulled.

Headings were cleared with an Eimco 21 Rockershovel loading into three-ton mine cars. The cars were hauled by a fine-ton Goodman locomotive. The 40-inch-gauge track was of 35-pound rail laid on steel ties, and there was no prefabrication of the sections. Three-man crews working three shifts could complete two full rounds.

Some 1,200 feet of pilot drift was completed before widening to the desired 18-foot width was started. The seven feet of rib was removed by starting at the face and drilling normal to the drift wall instead of parallel with it. This procedure permitted a retreating method of slabbing, and made possible drilling and blasting continuously without mucking. Three-man crews working three shifts were able to slab 120 to 130 feet daily—thus completing the 1,200 feet in two weeks. Mucking was then started from the shaft end of the drift.

LEFT: Tramp-iron protection is provided on the belt between coarse ore storage and fine crushing by this 24-inch, rectangular, Dings Magnetic Separator Company's electro-magnet suspended over the belt. RIGHT: One of the two Chicago Pneumatic Tool Company compressors which, powered with 150 hp. 2300-volt electric motors, supply 1,300 cubic feet per minute of air compressed to 100 pounds per square inch.





LEFT: Lime and copper sulphate are added to the 10 by 10 foot Denver Equipment Company conditioner ahead of the zinc flotation circuit. Sodium aerofloat and DuPont B23 frother are added at the conditioner discharge. CENTER: These four cells in the zinc flotation circuit are typical of the Denver Equipment Company "Sub-A" No. 30 flotation machines used throughout the plant. RIGHT: Both the lead and zinc flotation concentrates are filtered by this six-foot, eight-disc, Denver Equipment Company filter. F. B. Wharton is the operator.

Stoping Output High

Mining is from conventional open stopes with random pillars, and the working faces are advanced by headings and benches. The top heading, seven feet high and 30 to 40 feet wide, is carried along the back of the stope. The bottom is then pulled in benches 10 to 13 feet deep. Most of the pillars are left for support and will be removed last.

Drilling in the stopes is with Gardner-Denver S55 and S48 sinkers, mounted on Ingersoll-Rand Jacklegs and using one-inch hexagonal, collared-steel and Liddicoat L2, single-use bits. Bit life varies between 30 and 40 feet of hole. Powder requirements average 0.75 pounds per ton of ore broken. Rounds are loaded with 40 percent Atlas gelatin and shot with standard-delay Atlas or DuPont blasting caps.

Production rate is excellent. Average output, even before capacity operation had been reached, was 64.5 tons per miner shift. Loading and tramming is with Diesel powered equipment. The Traxcavator with one-half-yard bucket will load

a six-yard Koehring Dumptor in three to three and one-half minutes. From a point 560 feet from the skip loading pocket, a round trip of a Dumptor, including loading, averaged six minutes, in spite of nine inches of water flowing down the main haulage drift at the time.

The top of the ore hopper at the shaft is about 30 feet above the haulage level, and is reached by an inclined ramp extending to the north and south crosscuts. The Dumptors discharge into this hopper through a grizzly with 10-inch spacings. Contrary to common practice in most shallow orebodies of this type, C&H is successfully hoisting with two 2½-ton skips operating in counterbalance, a method believed to be more efficient than the usual hoisting in cans.

The hoist, a Nordberg Manufacturing Company's, has a single four-foot drum, is powered by a 150 hp. induction motor, and winds one-inch J. A. Roebling's Sons Company 6 by 19, IWRC, preformed hoisting wire. Speed is about 375 fpm., which means that one skip is dumped every 55 seconds.

Excessive Water Flow

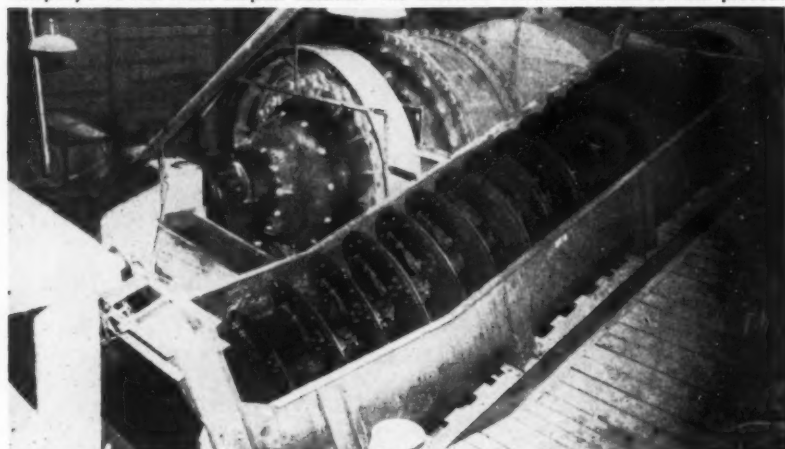
Large amounts of water in the strata opened was a serious handicap in the early stages of operation. Haulageways carried large streams of water to the sump, tending to hinder transportation. At one time water cascaded so heavily from the back of a stope in the north orebody that it was generally referred to as the "waterfall," a most descriptive term.

A sump with a capacity of 180,000 gallons extended 180 feet to the southwest of the shaft. Two pumping stations underground, one with two 1,000 gpm. Gardner-Denver centrifugal pumps and the other with two 750 gpm. Gardner-Denver centrifugals pump water to the mill storage tanks. On the surface are seven Pomona deep-well pumps. One of 1,000 gpm. capacity is at the manway at the main shaft, and four of 2,000 gpm. capacity each pump from the sump through churn-drill holes. Two 1,000 gpm. Pomonas pump from ditch sumps north of the shaft.

In the early stages of operations north of the shaft, pumping was at the rate of 7,000 gpm. After a little over a year of operation the area was fairly well drained and pumping stabilized at a lower figure. When the Gensler orebody was reached the figure jumped to 14,000 gpm. It later tapered off to about 8,000 gpm.

The problem of operating under very wet conditions and maintaining a large group of high capacity pumps was further aggravated by the abrasive quality of the fine pyrite and marcasite in the ore. These minerals caused excessive pump wear and necessitated frequent replacement of parts. The problem was partially combated by digging a series of trenches, or traps, across the drifts. Heavy minerals settled out in the trenches, were mucked out by hand and sent to the mill for treatment.

Two identical grinding circuits are used in the mill. Each has an 8-foot by 32-inch Hardinge Company, Incorporated, ball mill operating in closed circuit with a Colorado Iron Works Company's 48-inch Akins simplex classifier. The classifiers overflow a minus-65-mesh product.



A Western Mill

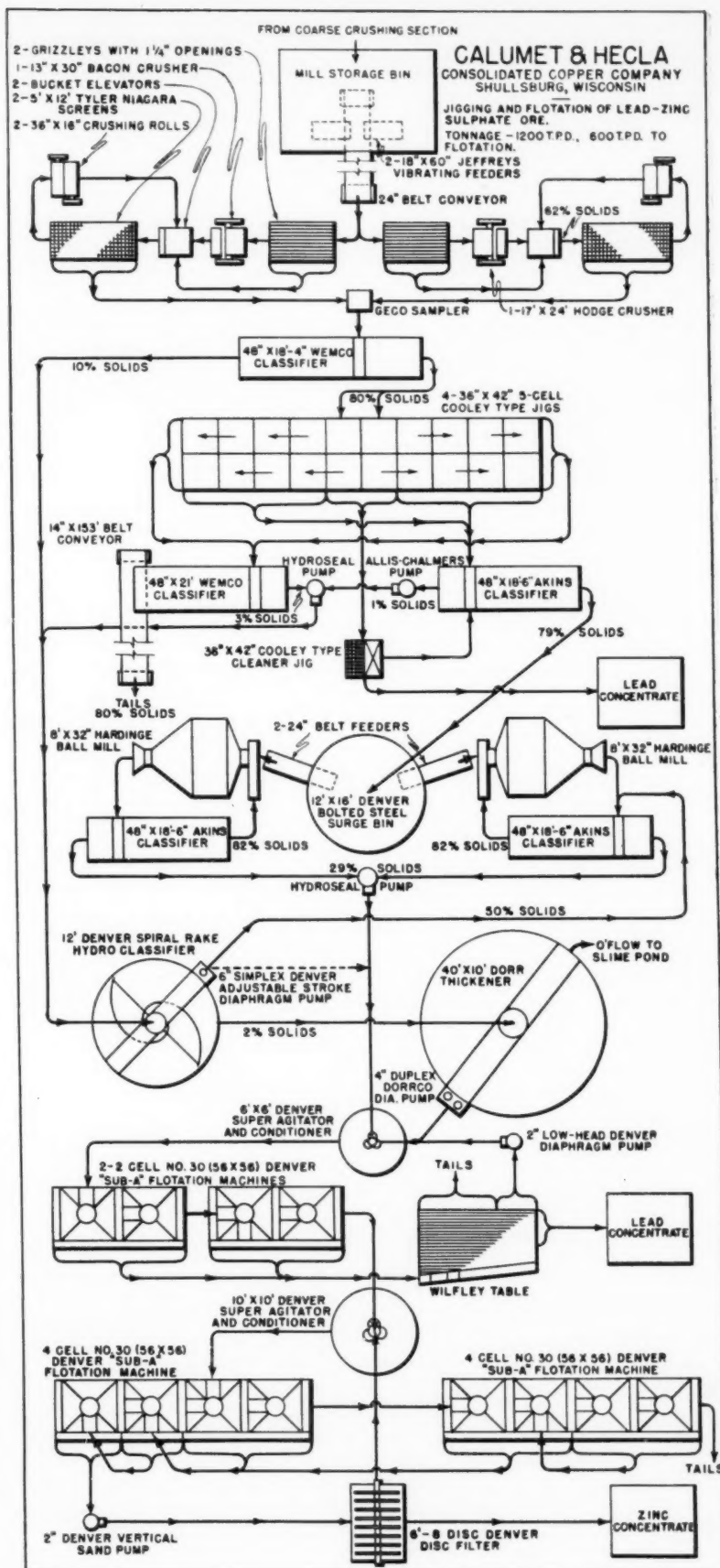
Probably because orebodies and ore formations in this area were similar to those found in the Tri-State and the Southeast Missouri lead belt, and perhaps because early operators came to the region from those districts, most mills in the section are patterned after those found in Missouri and Oklahoma, which are tall, small-area buildings with operating floors one above the other. Many bucket elevators, drags, etc., are used for raising material. C&H employed the Denver, Colorado, engineering firm of O. W. Walvoord to assist with mill engineering and erection. Result: Mill layout is much like the mills of the western non-ferrous districts. It is one large, main operating floor, two smaller balconies for light equipment; and material handling is largely by conveyor belts, pumps and gravity.

Minus-10-inch iron ore from the hoisting skips is discharged into one of two 150-ton rectangular receiving bins. Ross feeders of 100 tons per hour capacity draw it onto a slow moving (130 fpm.) 42-inch by 105-foot, Jeffrey conveyor with a 10-ply rubber belt. It passes through a 24 by 36-inch Farrel jaw crusher set at about four inches and is conveyed by a 24-inch belt to a double-compartment secondary bin. The bin has a live capacity of about 1,100 tons and the opening in each compartment is fitted with an 18-inch Jeffrey vibrating feeder of 50 tons per hour capacity. Ore can be drawn from either compartment, but not from both at once, onto a 24-inch Jeffrey conveyor for delivery to secondary crushing.

On the belt a Merrick weightometer records the tonnage of material. Double protection against tramp iron is provided by a Dings 24 by 30-inch rectangular, electro-magnet suspended over the lower end of the belt and a 24-inch Dings magnetic perma-pulley.

Crushed to Half Inch

Fine crushing is in two identical circuits, and flow can be split between them or handled in either. The ore belt delivers to a 17 by 24-inch Blake-type jaw crusher with corrugated Ni-Hard plates set at about 1½-inch. The crushed product is lifted 59 feet vertically by a 16-inch bucket elevator and discharged onto a 6 by 12-foot Tyler-Niagara, double-deck vibrating screen. The top screen is 1½-inch square mesh and the bottom ½-inch square mesh.





The electrical crew from left to right is James A. Preston, chief electrician, and Thomas Webb and John Loskot, electricians.

The oversize from both decks chutes to a set of 36 by 16-inch Nordberg crushing rolls. These rolls are built up with corrugations of Stoodly No. 21 self-hardening rods and are set to produce a 1/2-inch product. They discharge to the boot of the bucket elevator to place the rolls in closed circuit with the screen.

The minus-1/2-inch undersize from the bottom deck is sampled by a General Engineering Company automatic sampler as it passes to a 48-inch Wemco screw classifier for dewatering. The classifier overflows, by gravity, to a 12-foot Denver Equipment Company hydroclassifier with spiral rake. The rake product of the classifier is the rougher jig feed which is laundered to a splitter over the jig circuit.

Jigs Recover Coarse Lead

Harz jigs in two banks of 10 cells each are arranged with center feed so that, in effect, there are four circuits of five cells each. The jigs are 36 by 42 inches, have screens with perforations varying from 3/16 to 1/4 inches in size, have strokes varying from 1 1/4 to 1-5/16 inches and are bedded with natural material to a depth of about seven inches. Concentrate is drawn from the hutch and from the beds through one D-shaped cup in each cell. Concentrate from the four feed cells is raised by a 10 by 6 by 5-inch bucket elevator to a single 36 by 42-inch Harz jig for cleaning. The cleaner jig produces a final coarse lead concentrate of very high grade which is drained and shipped.

Reject from the cleaner jig joins the concentrate from other rougher jigs at a 48-inch double-pitch, Colorado Iron Works Company Akins simplex classifier for dewatering. Water from the cleaner jig and overflow from this dewatering classifier are delivered by a hydroseal pump to a Dorr hydroseparator.

Rougher-jig tailing is dewatered in a 48-inch Wemco screw classifier

ZINC, IRON AND LEAD CONTENT IN PERCENT AT CERTAIN POINTS IN THE SHULLSBURG MILL.

Location	Percent Zinc	Percent Iron	Percent Lead
Jig head	4.90	5.50	0.70
Jig tail	0.05	2.20	....
Flotation head	11.70	8.90	....
Flotation tail	0.15	8.25	....

and delivered by a 24-inch conveyor belt to waste. The tailing is sold to a railroad for ballast. Overflow from the tailing dewatering classifier is pumped by an Allis-Chalmers KWG-11 sand pump to the hydroseparator. The rake product of the concentrate dewatering classifier is ball mill feed. It is raised by a 10 by 6-inch bucket elevator to a Denver bolted-steel storage bin of about 125 tons capacity. Two 24-inch belt-conveyor feeders with Vari-Speed drives deliver it to the scoop box of the ball mill.

Preparation of Flotation Feed

Grinding is accomplished in two identical circuits. Each consists of an 8-foot by 32-inch Hardinge Company conical ball mill driven at 24.9 rpm. In closed circuit with the ball mill, and set to overflow a minus-65-mesh product, is a 48-inch Akins simplex classifier. The mills are lined with Ni-Hard liners and charged with three-inch forged steel grinding balls. Balls consumption is about 0.5 pounds per ton.

Reagents added to each ton of ore at the ball mill include sodium cyanide 0.013 pounds and aerofloat 242, 0.143 pounds. About one pound of lime per ton is added at the sump of the Hydroseal pump handling the overflow. The lime gives the pulp an alkalinity with a pH of 8.5.

The classifiers overflow to four-inch Hydroseal pumps which deliver the pulp at about 35 percent solid to a 6 by 6-foot Denver conditioner. No reagents are added at this point.

The underflow from the Dorr

hydroseparator is pumped to the ball mill discharge and enters the circuit via the classifier. Overflow from the hydroseparator passes to a 40-foot Dorr thickener. Most of the overflow from this thickener goes to waste, but a small amount is bled into the lead conditioner to reduce the pulp to about 25 percent solid. The thickened product collected at this point is delivered by diaphragm pump to the lead conditioner. A bit of sodium cyanide is added at this pump to depress the zinc in the pulp which has not been subjected to reagents in the ball mill circuit.

Float and Table Lead

The lead flotation circuit consists of four Denver "Sub-A" No. 30, flotation cells. Feed enters at the first cell and a froth containing the galena and a brown shale, locally called oil rock, is skimmed from all cells. The tailings enter a 10 by 10-foot Denver conditioner ahead of zinc flotation.

The contaminated galena concentrate is then treated on a Mine and Smelter Supply Company's No. 60 Wilfley table with rubber covered deck. Table concentrate is blended with the jig concentrate for shipment, and the table tailing goes to waste.

Pulp is prepared for zinc flotation by the addition of two pounds of lime per ton of ore resulting in a pH of 9.5 to 10. The high alkalinity is made necessary by a pyrite problem. Also added are 1.8 pounds of copper sulfate, 0.122 pounds of aerofloat, and 0.04 pounds DuPont B23 frother. Feed enters the third cell of a seven-cell Denver "Sub-A" No. 30 flotation machine. The froth from cells three, four, five and six is cleaned in the second cell and recleaned in the first cell. The recleaned concentrate is pumped to an eight-disk, six-foot, Denver filter and dewatered for shipment.

Cells seven and eight are scavengers, and the froth from them is pumped to the sixth cell. Tailing is pumped to waste.

The lead concentrate will range between 70 and 75 percent metal, averaging about 74 percent. The zinc concentrate averages about 62 percent. Moisture in the filter cake can be held at about 8.5 percent and iron below 2.5 percent.

Concentrates drop from the filter to a 120-ton bin from which they are loaded into trucks and hauled four miles to the railroad. At the railroad they are loaded into cars with a Tracto Shovel mounted on an Allis-Chalmers HD crawler tractor.



General view of Columbia Iron Mining Company's openpit iron ore mine in Iron County, Utah. The lighter-colored overburden has been stripped from the darker iron ore which is being loaded into Euclid dump trucks by electrically powered Bucyrus-Erie shovels.

COLUMBIA IRON MINING CO'S DIESEL-ELECTRIC PLANT DESIGNED FOR FLUCTUATING PEAK LOADS

By E. J. Watts

Sales Engineer
Worthington Pump and Machinery Corp.
Salt Lake City, Utah

The mining of iron ore in Utah had its beginning 100 years ago. In December, 1849, a company of men commissioned by the General Assembly of the Provisional State of Deseret left Salt Lake City to explore the southern part of the state and determine the feasibility of colonizing the area.

During the exploration the party discovered, a few miles west of what is now Cedar City, a range of hills containing iron deposits. A report of the finding was filed with the Legislative Council of Deseret in 1850. By the fall of that year, a band of colonists had migrated to the area and by the spring of 1852 two foundries were in operation which were turning out a ton of pig iron per day. The ore was hard to flux, and since obtaining skilled workers was difficult and transportation costs were excessive, the undertaking was finally abandoned.

Several years later a second attempt was made to commercialize the iron deposits, this time on Little Pinto Creek at the foot of Iron

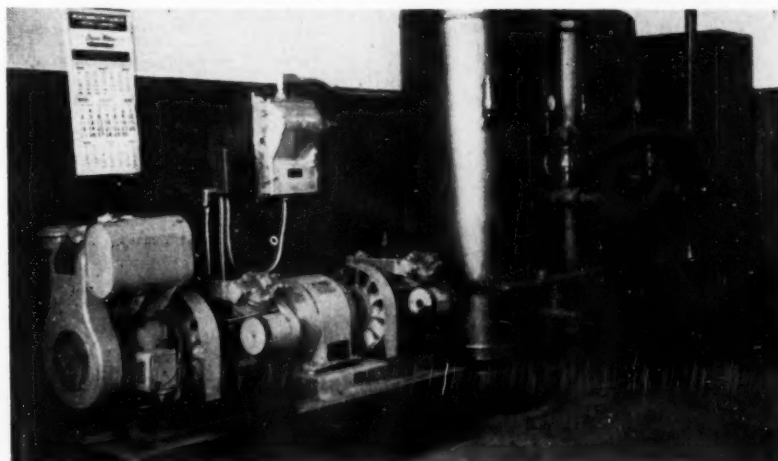
Mountain. Soon about a ton of good quality pig iron was being produced each day.

Throughout these early years, the iron industry was beset with difficulties. The coal which was found in Cedar Canyon, only a few miles away, contained too much sulphur to make metallurgical coke. As a result, charcoal was made from the region's abundant cedar trees. Then, the railroads expanded, and to import iron from eastern mills was

found to be cheaper than to mine and furnace the ore under the adverse conditions prevailing on Little Pinto. In only a short time all activity ceased.

About twenty-five years ago large scale development of the Iron Mountain deposit was resumed. The Columbia Iron Mining Company opened its operation in 1936 at Iron Mountain. At that time one 2½-yard shovel and one churn drill were sufficient to supply the mill.

The Diesels are started with compressed air from these Worthington air-starting sets. Note that one compressor is driven by a gasoline motor and the other by an electric motor.



Openpit Iron Ore Mine

Today, driving on the fine highway west from Cedar City, the scenic beauty of the country is undisturbed until you make a turn off the highway after twenty miles and look upon the activity surrounding a large scale openpit iron mine.

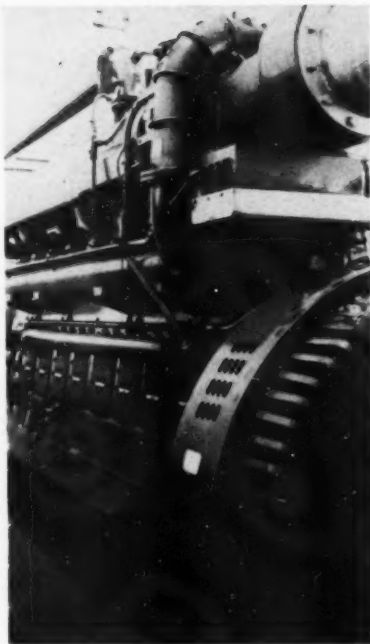
The overburden is removed, electric churn drills are set up on the exposed ore, holes are drilled and loaded, and the ore is blasted loose. The electrically powered shovels move in and begin loading the Diesel trucks, which haul from 20 to 30 tons of ore per trip to the crushing and screening plant. The ore is milled, loaded into railroad cars and hauled to the north where it is furnaced in Geneva Steel Company's plants, located at Geneva and Ironton, Utah.

Power for Operations

To supply power for expanding operations at Iron Mountain, Columbia Iron Mining Company has provided its own electric power-generating facilities.

The company's electrical engineers, knowing the severity of the electrical load, determined that the power plant for their requirements would have to meet a load changing at the rate of 250 kilowatts per second with a frequency variation from 60 cycles limited to plus-or-minus-one-cycle. The engineers also determined that the most suitable primary power source would be Diesel engines.

A study was made of heavy-duty, stationary, Diesel engines and the decision was made to purchase three Worthington SDH, 8-cylinder, 12-inch bore by 14-inch stroke, 4-cycle, supercharged, 600 rpm. Diesel en-



One of three Worthington, SDH, four-cycle, supercharged Diesel engines in the Columbia Iron Mining Company's power plant. The turbocharger is in the foreground.

gines. Each engine develops 710 kw. at an elevation of 6,500 feet above sea level at 65°F. ambient temperature and is directly connected to a Westinghouse 2400/4160 volts, 60-cycle, 3-phase, altitude-rated, engine-type-generator with a 1750 rpm. Vee-belt-driven exciter.

Each engine is installed with independent jacket water and lubricating oil cooling system consisting of a Worthington C N centrifugal pump, Young radiator, and Ross lubricating oil cooler. The jacket water inlet temperature to each engine is controlled by means of a

thermostatically operated Fulton-Sylphon 3-way valve. Lubricating oil is filtered by means of a Hilco Model HFC-8 by-pass filter. An oil-bath, air-intake American Air Filter and a Maxim exhaust-gas silencer are used on each engine.

Control of each engine is accomplished by means of a Woodward UG-8 isochronous governor with motor-operated synchronizer. Starting air is provided by a Worthington 5TBM and 5TBE motor—an engine-driven, air-starting set discharging to two 30 by 78-inch air receivers. Each engine is protected with high oil-and-water-temperature and low oil-and-water-pressure alarm and shut-down devices. The engines are lubricated with a detergent lubricating oil and fueled by No. 2 Diesel oil.

Severe Power Demands

When the installation was completed early in December, 1949, an acceptance test was made of the performance of each engine under actual load conditions. Oscillograph readings were recorded of frequency, voltage and kilowatt load. Each engine performed as required.

Visualize a load which varies from 0 to 850 kw., down to 250 kw., up to 600 kw., down to 200 kw. and up to 1,200 kw. and often 1,700 kw., all in a matter of seconds, and you have some idea of the type of load the engines are required to carry. Two engines have carried momentary peaks of 1,700 kw. and held frequency. Only on week-ends does the wattmeter maintain a comparatively constant position. The voltage regulation under operating conditions is excellent.

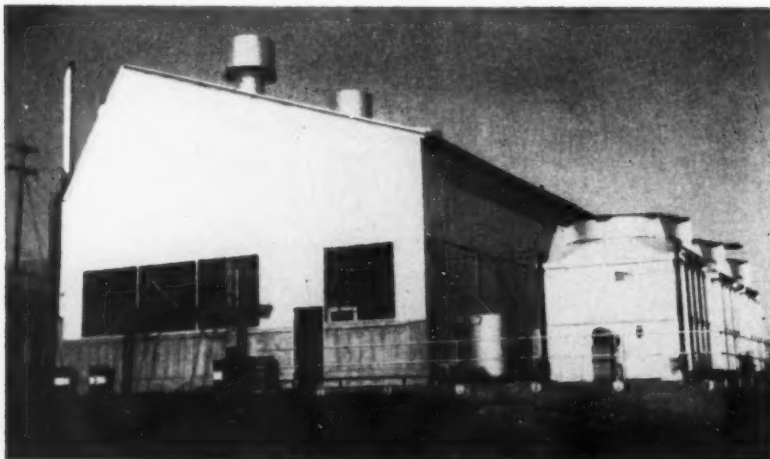
Acknowledgment

R. C. Talbott, chief engineer of Columbia Iron Mining Company and Geneva Steel Company, was in overall charge of the design and installation of the power plant. Myron Strate, chief electrical engineer, planned the installation, assisted by G. B. Standiford of the electrical engineering department.

G. D. McDonald is superintendent at Iron Mountain and Jack Strate, master mechanic, is responsible for the operation and maintenance of the power plant.

Albert Cane, mechanical foreman at Iron Mountain, who has been at the property for over 24 years, provided the writer with the historical data.

View of the power plant showing the Young radiators installed outside of the building.



An adit has been started on the north vein on the eastern side of the creek. High grade ore is piled to the right of the portal.



CHARLEY CREEK BISMUTH PROSPECT BEING DEVELOPED BY ALASKAN MEN

The National Production Authority, United States Department of Commerce, has issued a bismuth conservation order (M-48). This order, effective April 1, 1951, placed all bismuth in the United States under strict conservation control and among other things limited the use of bismuth and its alloys for certain essential purposes only.

Properties and Uses

Bismuth is a white metal with a reddish tinge, is very lustrous in its pure state, is brittle and quite soft, is slightly ductile at 100° C. and when bent at this temperature emits a creaking sound due to friction of the crystals. It is a poor conductor of heat and electricity, (approximately one eightieth of copper), is very diamagnetic and solidifies with a 3.3 percent expansion. This last property lends itself particularly to making alloys for producing sharp castings of objects subject to damage by high temperatures. Bismuth has been used for many years in the casting industry, where the alloys of the metal have been metallurgically more important than the metal itself in making low temperature melting solders of all kinds, some of which melt at a temperature as low as 100° F. The salts of bismuth are widely used in both medicine and industrial chem-

ical technology. In fact, about 80 percent of the bismuth used is in the nonmetallic state.

Bismuth is the most diamagnetic metal known, a sphere or bar of it is sharply repelled by a magnet. Metallic bismuth tarnishes very slowly in dry air at ordinary temperatures, but somewhat more readily in moist air or when heated. The purer the metal the more resistant it becomes to oxidation. In addition to its importance in the metallurgical and pharmaceutical industries, it has very valuable properties for the electrical industry. The brittleness of bismuth—it is one of the few metals that can readily be pulverized by hammering—has probably prevented a much wider application however. Recent work by the Fitzpatrick Electric Supply Company of Muskegon, Michigan, has resulted in the manufacture of ductile bismuth wire which will not age, harden, crystallize or disintegrate.

By-Product Metal

In the United States nearly all the bismuth produced is a by-product of the smelting and refining of lead and copper ores and concentrates. Foreign production is centered at The Consolidated Mining & Smelting Company of Canada, Ltd., Trail, British Columbia, and the Cerro de Pasco Copper Corporation's mines and smelters in Peru.

The Sang Dong tungsten mine in South Korea contains large reserves of tungsten-bismuth ore. Certain of the Bolivian tin ores contain up to one percent bismuth.

Only a few mines have produced important amounts of ore primarily valuable for its bismuth content. Among these are the Tasna mine in Bolivia and a mine near Tonecampos, Spain. The present price of bismuth in the United States is \$2.25 per pound.

Charley Creek Prospect

In view of the essential uses of bismuth and its occurrences, the activity of O. A. Margraf, I. Kowalski, and Wilson and Dave Russell at their Charley Creek bismuth prospect about 35 miles north of Nome, Alaska, is of interest.

Bismuth was first discovered on Charley Creek, a tributary of the Sinuk River, by John Dahl and Louis Erikson in 1902. Dahl and his associates did a little open cut work on both sides of the creek, exposing two small veins 8 and 12 inches in width. However, at that time the entire world's need for bismuth was less than 200,000 pounds annually and was cheaply supplied by Asiatic countries, so in 1908 Dahl left Nome and soon after the claims lapsed for lack of assessment work. Hamburger and Shoemaker staked some claims on Charley Creek in



During the 1950 operating season a bulldozer road was built to the claims and a "wanigan" hauled in for the crew to live in.

1910 and they claimed ownership for twelve years without any new work. Since their deaths, some twenty years ago, the property was almost forgotten. The last published mention of it was in the U. S. Geological Survey's *Bulletin 722*, 1920. On page 223 the following was reported:

"A quartz vein containing a little disseminated bismuth sulphide is exposed in the stream channel of the east fork of Charley Creek, a tributary from the south to upper Stewart River. The deposit lies about 25 miles due north of Nome. It does not appear to be of commercial value, so far as can be determined from the exposures, but a description is included here because the occurrence of vein bismuth is unknown elsewhere in the peninsula."

This report was apparently in error in that Charley Creek is a tributary of the Sinuk River and not of the Stewart River, and also the distance from Nome was underestimated. The prospect is found on Plate IV of the Geologic Map of the Grand Central Quadrangle from the U. S. Geological Survey *Bulletin 533* by F. H. Moffit, 1913. Also in that bulletin, mention of the deposit is made on page 133 as follows:

"On the east branch of Charley Creek at a point about 1,000 feet from the forks and at an elevation of 950 feet above sea level, two parallel quartz veins appear near the stream bed and have been found to carry the bismuth. These two veins are about 12 inches and 8 inches in thickness and are separated by 16 to 18 inches of schist. They occur in strike joints dipping 50 to 60° and may be

traced on the surface for only a short distance because of the covering of loose slide rock. At one place they are offset about 8 to 10 inches by a small fault. The proportion of bismuth seen in the veins is small, but some boulders found in the stream below show a larger amount."

Relocated in 1949

The property was again located by Oscar Margraf and his partner Ignacius Kowalski on July 30th, 1949. Since that date they have taken as partners, Wilson and Dave Russell.

On October 9th, 1949, the Russell brothers and Margraf visited the property mainly to stake out the most feasible route to build a tractor trail. They were accompanied by Daniel Jones, mining engineer, from the Alaska Territorial Department of Mines, who came to make a preliminary examination of the property. About 15 feet north of the original discovery and parallel to the known veins a third vein was uncovered. This vein was 26 inches in width and the bismuth content was small; however, fair size crystals of bismuth were scattered through the quartz. Subsequent work opened up a vein at a lower level near the creek which showed sufficient values to justify piling up the ore for future mill treatment. This vein has been traced and exposed by open cuts for some 300 feet along its strike. Close examination of the vein indicates that this was the source of the boulders found in the stream below as mentioned by F. H. Moffit in *Bulletin 533*.

The open cut work on both sides of the creek exposes three parallel

veins of 8 inches, 26 inches, and lastly 20 to 41 inches in width. These veins all strike N.80°W. and dip 60°N. and are separated by schist country rock. The quartz is of the open-textured type showing numerous cavities lined with well terminated bismuth in the crystals. The wall rock is quartz-muscovite schist containing considerable chlorite and biotite, a little graphite, pyrite and tourmaline. The vein cannot be traced beyond the creek to the east because the valley sides are covered by moss and talus. On the west side of the creek the veins' course is easily followed by a depression caused by erosion of the mineral zone leaving the hanging wall, which is apparently harder and forming a small water course that channels rain water into the creek. The veins are traceable by this method for over a thousand feet although the last open cut exposure is only 300 feet west of the creek.

Placer Possibilities

O. A. Margraf reports the placer deposits immediately below the veins have been reasonably well prospected for a distance of 1000 feet. About 10,000 cubic yards of gravel will yield from five to 75 pounds of concentrate to the cubic yard. Concentrates taken from prospecting, assay in the crude state from 36.77 to 63.00 percent bismuth. By using the lowest figure obtained for the 10,000-yard block, the mine should produce 25 tons of shipping concentrates in thirty days. The above production volume is based on sluicing better than 300 yards per day through the hydraulic plant which was taken in 1950 to the end of the Snake River road, some five miles from the prospect. The plant will be installed immediately upon completion of the last mile and one half of tractor trail to the mine.

Once the placer operation is started, plans call for driving adits and sinking shafts with the lode mining equipment on hand at the prospect.

In the event exploratory work indicates that the surface values continue to a reasonable depth, installation of a small concentrator, possible 25 tons and not to exceed 50 tons, will be made.

Placering and mine development during the 1951 operating season should indicate the value of the property and could result in the first bismuth mine in Alaska.

John D. Mitchell Tells of

LOST MINES AND BURIED TREASURES

LOST LEDGE OF FOUR PEAKS



Doctor Thorne, an Arizona pioneer, spent the last 39 years of his long and eventful life searching for a fabulously rich gold ledge. The ore deposit was said to have been shown to him by the Tonto Apache Indians during the many years he was held captive by the tribe. His search centered in and around the rugged ravines of the Four Peaks country, northeast of the City of Phoenix, Arizona.

It was in the year 1849 that Thorne, then a young physician just out of school, set out across the great plains. A year later he was captured by the hostile Tonto Apaches. The Indians treated him well, recognizing his skill as a physician, but refused to turn him loose.

About 1861, a great drought came to the Indian country. Pinon nuts and seeds of all kinds were scarce, the wild game drifted away in search of better forage, and near starvation faced the tribe. Then, while the Apache warriors were away raiding, disease broke out among the squaws and papooses of the tribe. The epidemic continued to grow worse while the Apache medicine man exhausted all of his tricks without finding a cure. In desperation the old men of the tribe appealed to Doctor Thorne for help.

Thorne realized the seriousness of the situation and that his reputation as a doctor was at stake, so decided to use one of his strongest remedies—a tuber known to the Indians as hickemia which still grows in many parts of Arizona. The remedy worked like magic.

When the warriors returned from their raids, a powwow was held, and it was decided to release the doctor so that he might return to his own people. As an added proof of their gratitude, they agreed to show Thorne their rich gold ledge, for the Indians never forget their friends.

On the day set for the release, the little party headed out of the mountains in a southerly direction, six feathered warriors serving as an escort. They rode the skyline of the high ridges for a while, then dropped down into the lower country and

skirted a high mountain off to the northeast of the Superstitions. Late that afternoon the party halted, and a blindfold was placed over the doctor's eyes. Then the trip was continued.

Just before sundown the three warriors who were riding ahead came to an abrupt stop. Thorne was ordered to dismount and the blindfold was removed. As his eyes became accustomed to the bright sunlight, Thorne realized he was standing in a narrow canyon, while at his feet he saw a white quartz vein about 18 inches wide cutting across the waterworn bed of the canyon and outcropping in the walls on each side. The vein was full of bright yellow metal that glistened in the sun. As the blindfold was replaced, Thorne looked up and saw the Four Peaks vividly outlined against the deep blue sky. The sun was at his back, so the vein must have been on the south or west side of Four Peaks Mountains.

As the little party rode down the zig-zag trail the doctor concentrated on remembering every landmark so he could return later and locate the vein. He hoped in that way to com-

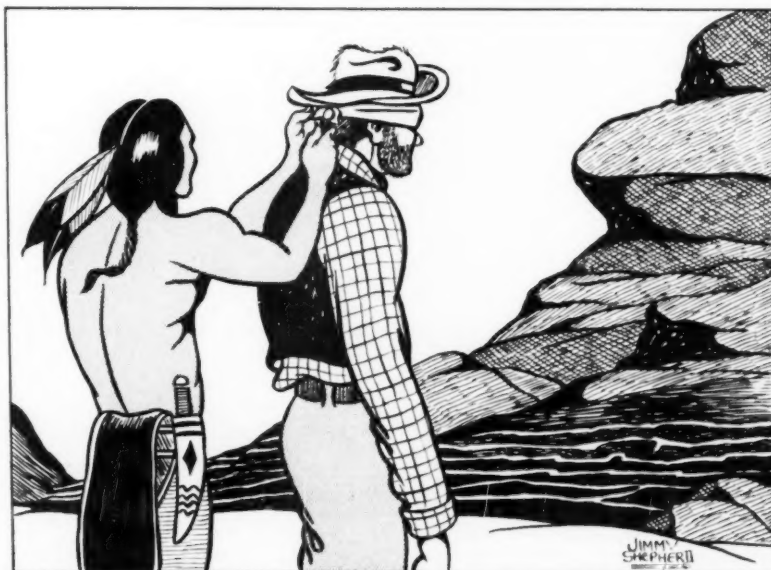
pensate himself for the years he had been held captive.

Thorne was released on the desert, east of the city of Phoenix, early the following morning. Years later, when the fierce Apaches had been rounded up and placed on reservations, Thorne returned to the desert country and started his long search for the vein of white quartz.

He made many trips into the Four Peaks country and was well known to a number of old-timers living in Tempe and Mesa. To these friends he talked freely of his experiences among the Tonto Apaches and of the lost ledge. When too old and feeble to endure the many hardships of prospecting in the rugged mountains, he went to the Rio Grande country in New Mexico. He died shortly afterwards, without having found a place that even resembled the narrow canyon where the Indians had shown him the vein of rich gold ore.

Fame and fortune await the prospector who rediscovers where the white quartz vein studded with bright yellow gold crops out in the narrow canyon over which the Four Peaks stand silent guard.

Thorne was ordered to dismount and the blindfold was removed.



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The following table shows a partial breakdown of more than 2,000 standard WEMCO Classifier models:

OPTION	DESCRIPTION	REMARKS
1 SPIRAL DIAMETERS	<p>FROM 12" 18" 24" 30" 36" 48" 54" 60" 66" 72" 78" 84" 96" TO</p>	A right diameter for every job, giving better balance between sand conveyance and pool area requirements.
2 SPIRAL PITCH	<p>SINGLE DOUBLE TRIPLE</p>	"S-H" (Special Helix) advanced pitch design on all models, giving up to 100% greater raking capacity compared to other designs.
3 SPIRAL LENGTH	<p>SHORT MEDIUM LONG</p>	Length furnished to fit exact needs of each job—correct lengths for closed circuiting—adequate drainage deck length for dewatering.
4 TANK STYLE	<p>STRAIGHT MODIFIED FLARE FULL FLARE</p>	Tank styles to fit the characteristics of the material and the separation to be made—up to 25% greater "effective" pool area than other units.
5 POOL DEPTH	<p>HIGH WEIR STANDARD WEIR SUBMERGED SPIRAL</p> <p>SERIES "90" SERIES "125" SERIES "150"</p>	Generally Series 90 is used for 48 mesh and coarser separations, Series 125 for 48 mesh to 150, and Series 150 for 100 to 325 mesh separation.
6 ASSEMBLIES	<p>SIMPLEX DUPLEX</p>	Duplex units give nearly double the capacity of simplex units, but require less floor space than two separate units.
7 LIFTING DEVICE	<p>HYDRAULIC, MANUAL HYDRAULIC, MOTORIZED SCREW, MANUAL</p>	Smooth, powerful hydraulic action is usually preferred to the older style screw lift.

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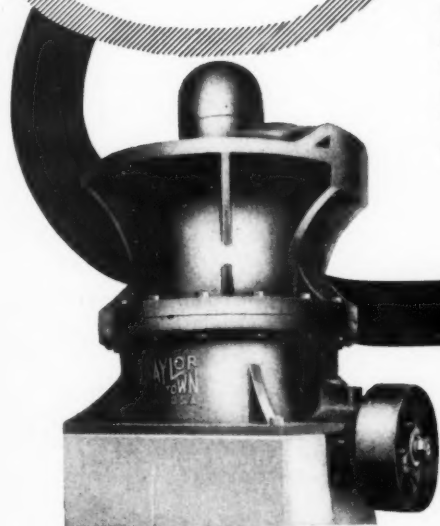
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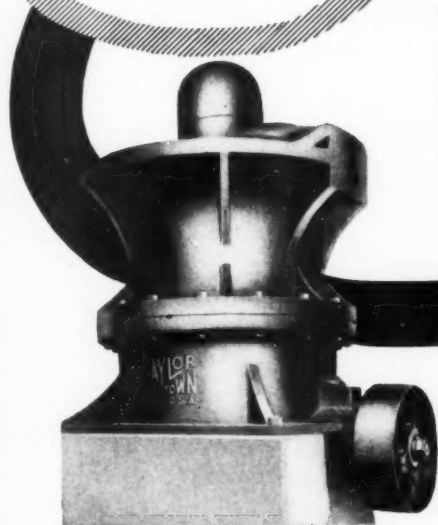
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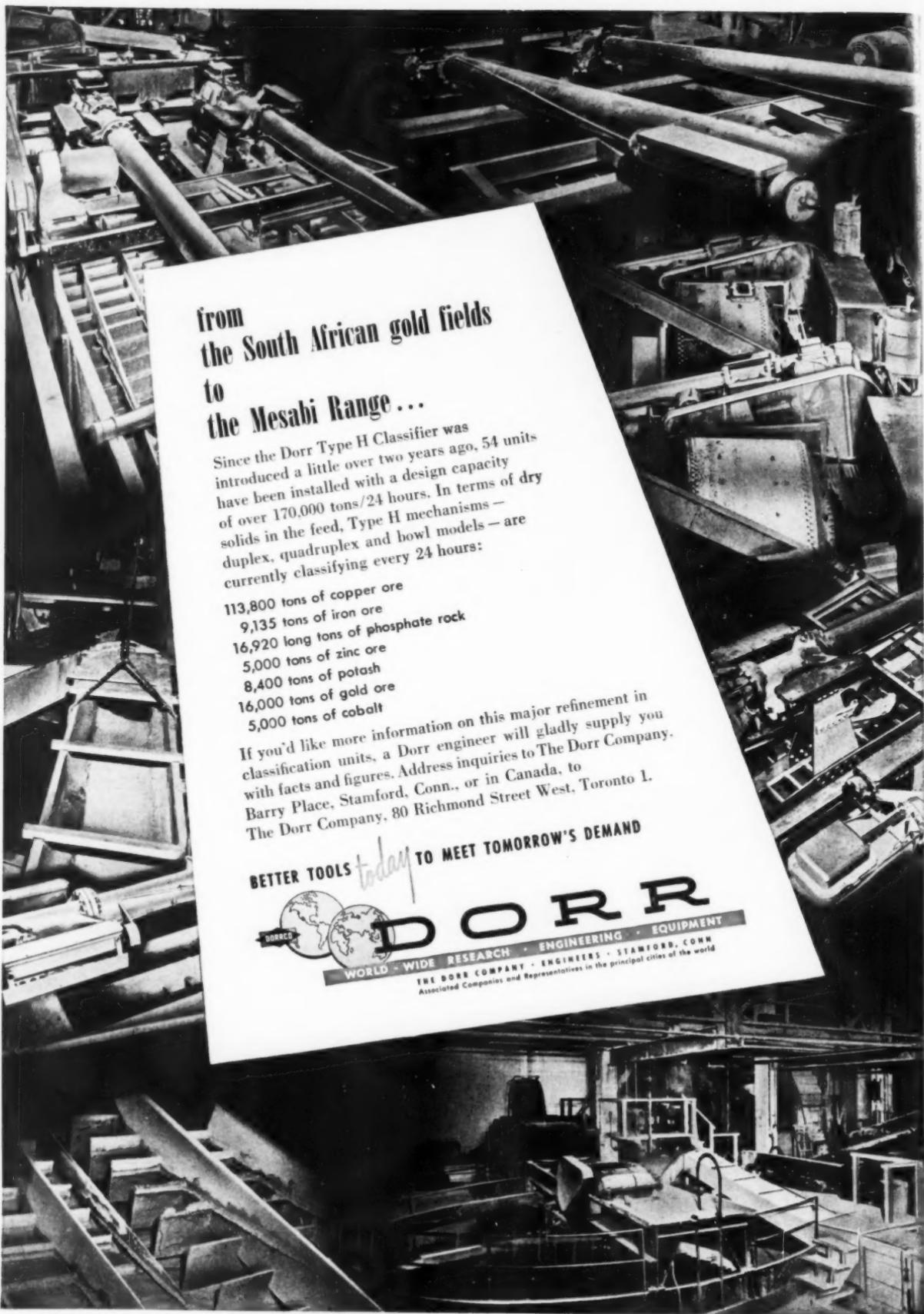
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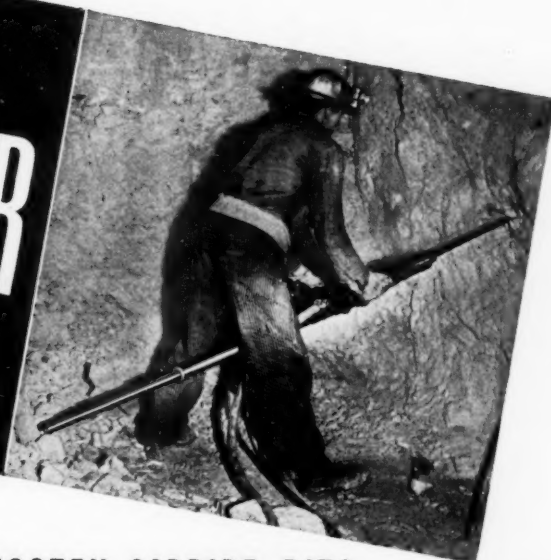
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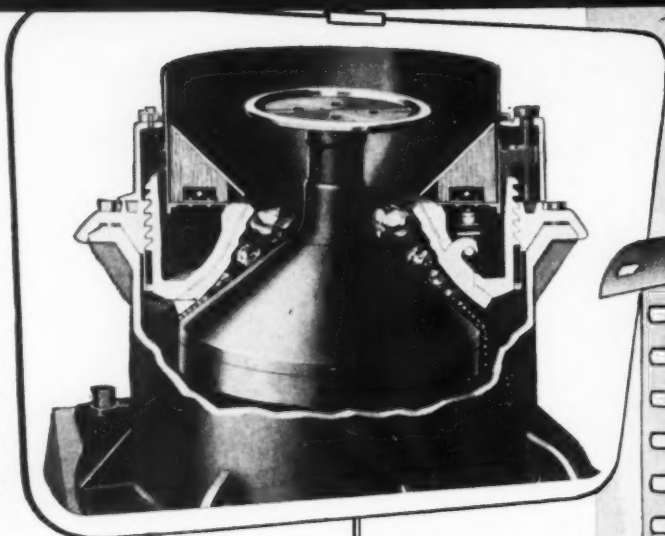
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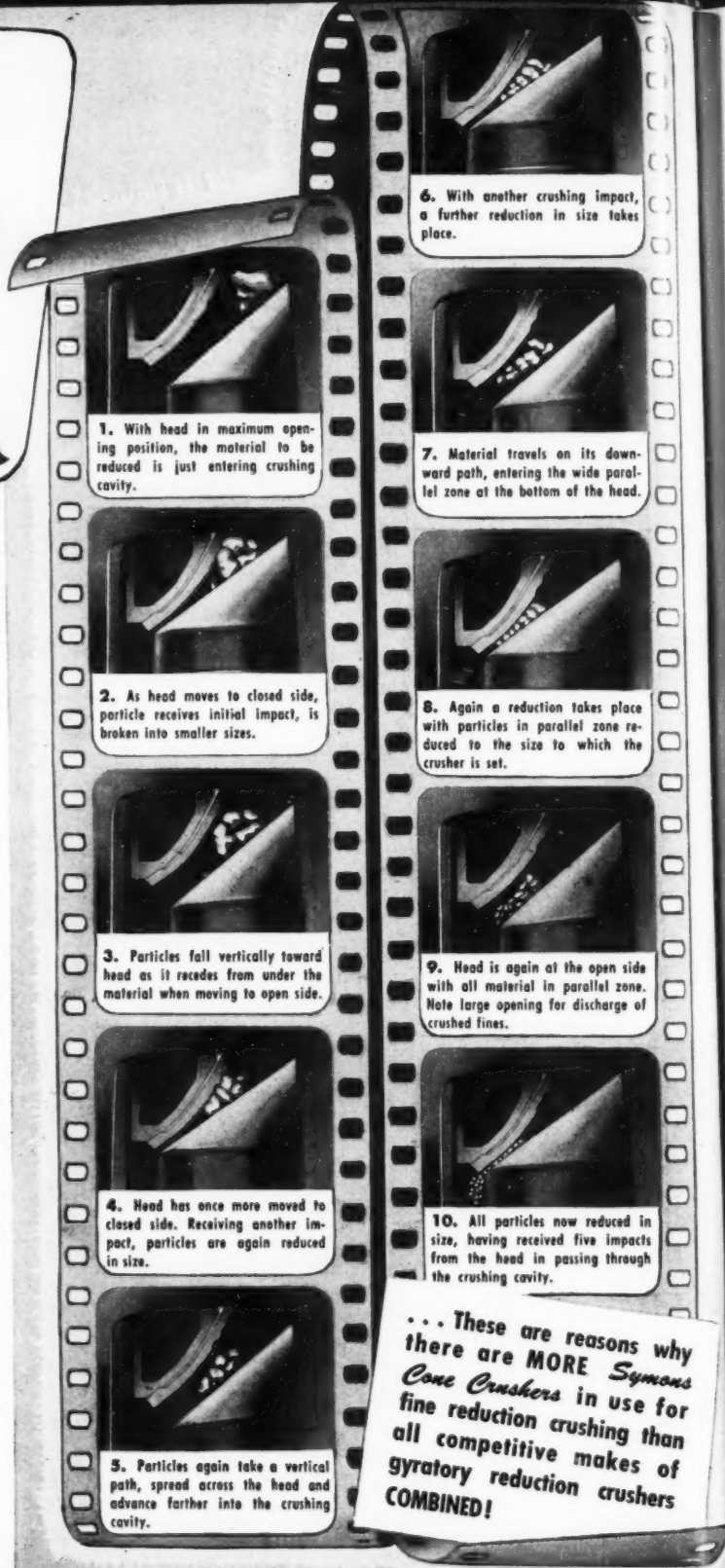
The crushing action in the SYMONS CONE is a combination of controlled feed, high speed, timing, and extraordinarily large discharge capacity. These factors, coupled with the spring release safety feature of being able to pass uncrushable items—such as tramp iron, etc.—constitute ample proof of the superiority of the SYMONS CONE and the SYMONS PROCESS OF CRUSHING.

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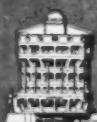
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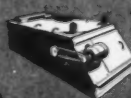
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INTERNATIONAL PANORAMA

DULUTH—During the period from December 1950 through March 1951 of winter rail movement of iron ore from Minnesota to blast furnaces in Chicago, Illinois, Gary, Indiana, Pittsburgh, Pennsylvania and Youngstown, Ohio, approximately 1,000,000 tons of iron ore was shipped.

RIO DE JANEIRO—A contract has been awarded for the design, construction and initial operation of a blast furnace and a battery of chemical-recovery coke ovens for the Brazilian National Steel Company at Volta Redonda, Brazil.

WALLACE—The Federal Mining and Smelting Company is going to sink a new shaft at the Page mine at an estimated cost of \$1,000,000.

JOHANNESBURG—A new firm, Union Tin Mines Ltd., has been formed to explore and develop a tin deposit in the Waterburg district, Transvaal. The deposit has not been worked since 1914.

BALTIMORE—Fourteen iron ore carriers with an aggregate tonnage of 279,500 are now under construction. Ten are bulk carriers, three are Lake ore carriers, and one is a river ore carrier.

HENDERSON, NORTH CAROLINA—Haile Mines, Inc. is negotiating a contract with the federal government for delivery of 600,000 short ton units of tungsten concentrates over a seven-year period. Mining and milling would be expanded from 300 to 500 tons per day.

DULUTH—The Head-of-the-Lakes iron ore shipping season opened on April 11th. This is three weeks ahead of the 1950 opening date.

OTTAWA—Canada's Defense Production Department's metals administrator has issued Order No. 1 which placed nickel rationing under government control.

ELY, NEVADA—The Nevada Mines Division, Kennecott Copper Corporation, will sink a 1,575 foot deep shaft and develop and mine a copper orebody extending partially under the town of Ruth.

VALPARAISO—Cia. Salitrera de Tarapaca y Antofagasta is planning plant expansion of its Victoria unit to double the present monthly capacity of 12,000 tons.

JOHANNESBURG—Jeanette Gold Mines, Ltd. has started sinking its No. 1 shaft in the Odenaalsrust area of the Orange Free State.

WALLACE—Day Mines, Inc. has formed a new Canadian subsidiary, Diem Mines, Inc., to operate mines in southern British Columbia and the Metaline district of Washington.

MONTREAL—A company has been formed to dredge magnetite sands from the St. Lawrence River shoreline 530 miles from Quebec City.

HIBBING—To treat wash-ores, the Oliver Iron Mining Company will build a new washing plant adjacent to its Hull-Rust mine's crushing and screening plant.

BULAWAYO—Production of chrome ore by the Vanadium Corporation of America's mines in March was three times larger than in March 1950.

TRAIL, BRITISH COLUMBIA—The Consolidated Mining & Smelting Co. of Canada, Ltd. is rushing shipments of lead bullion by railroad to Atlantic coast ports for shipment to England to alleviate a lead shortage. Ocean shipments are usually made from West Coast ports. The company also has announced expansion plans to cost \$62,800,000. The latest expansion will be a 205,000 hp. hydroelectric plant on the Pend Oreille River.

KINGSTON, JAMAICA—The first strategic minerals repayment to ECA has been made in the form of \$200,000-worth of aluminum produced from Jamaica bauxite in partial payment of grants.

NEW DELHI—The Brainard International Company, a United States firm, and the Indian government have completed negotiations for Brainard to build a 25,000-ton per year ferromanganese plant at Orissa at a cost of \$2,100,000.

CARACAS—Aluminium Limited's subsidiary, Aluminum Company of Canada, and the Venezuelan government are discussing the possibility of the company erecting an aluminum reduction plant in the Orinoco region. Bauxite from the Guianas would be processed.

OSLO—Norway's atomic energy reactor at Kjeller, near Oslo, is scheduled for early operation. It was built at a cost of £750,000 and will be used to make radioactive isotopes for scientific research purposes.

MONTREAL—Aluminium, Ltd., of Canada has started a program to increase aluminum output by 150,000 metric tons per year. An integrated bauxite-to-metal plant with an annual capacity of 80,000 to 100,000 metric tons per year will be built in the Tweedsmuir Park area of British Columbia. First production is scheduled for 1954.

WASHINGTON—The Federal government will begin purchasing domestic tungsten ores on July 1st at a guaranteed price of \$63.00 per short ton unit. The price is guaranteed for the next five years.

WENATCHEE, WASHINGTON—The Aluminum Company of America is to build a \$45,000,000 aluminum reduction plant here. It will have a capacity of 85,000 tons annually.

ANKARA—Prospecting and development of a newly discovered tungsten deposit in Eastern Turkey is being continued to ascertain the commercial possibilities of the discovery.

RIO DE JANEIRO—Important asbestos deposits have recently been discovered at Grotas Miudas, district of Ponciano, Traipu, State of Alagoas.

HELSINKI—A decision has been reached by the Finnish cabinet to open the Otmaki iron-titanium mine in central Finland and to build a concentrator to treat the ore at the mine.

Foreign Firms Need Serial Number for U.S. Supplies

Foreign mineral producers who wish priority assistance to obtain equipment, machinery, and operating supplies from the United States must apply for serial numbers with the Office of International Trade, U. S. Department of Commerce, Washington, D.C. However, firms in Canada, in Economic Cooperation Administration participating countries, and countries in which ECA has programs should file as follows: Canada to the Canadian division of the National Production Authority, and ECA countries with ECA. Producers of oil and gas are not included in the group.

Data must be furnished on Form MF-100 in quadruplicate with copies of the firm's latest annual report attached if the firm does not wish to fill out items 8, 9, and 10 of Form MF regarding company organization, ore or mineral reserves. Also the firm must furnish OIT with four copies of a breakdown by products and quantities of the international distribution of its production, both domestic and foreign. Factors determining this distribution, such as commitments to governments or long-term contracts, should be explained.

INCO Raising Output One Million Lbs. Per Month

To increase nickel production by about 1,000,000 pounds per month before the end of the year, the International Nickel Company of Canada, Ltd., is installing emergency facilities at its Ontario, Canada, properties, according to Dr. John F. Thompson, chairman and president, speaking at the annual meeting recently. Present production is at capacity of 20,000,000 pounds per month.

Other highlights from the report of the meeting were that the company has arranged with the U. S. Atomic Energy Commission to design a pilot plant at Huntington, West Virginia, which will be leased from the Commission and operated by the company; and that, in connection with the company's overall underground mining expansion in Ontario (conversion to all-underground workings is in progress), about \$100,000,000 has been spent in the following ways: To handle lower-grade ores at the Creighton mine, a new shaft is being completed, and a 10,000-ton mill has been completed from which concentrates are pumped seven and a half miles to the reduction plant at Copper Cliff. The Murray mine was brought into production in 1950, and a new and major portion of the Frood-Stobie underground mine—the Stobie section—will be brought into production as the expansion program progresses. Shafts at the Levack, Garson and Murray mines are being deepened. A 300-ton-per-day oxygen generating unit and a new copper-concentrate smelting furnace should be completed by the end of the year. By 1953, the company will be able to hoist about 13,000,000 tons of underground nickel-bearing ore per year.



General view of part of the Nsuta openpit manganese mine of the African Manganese Company, Limited.

MANGANESE FROM THE GOLD COAST

The African Manganese Co., Ltd., operates one of the world's largest openpit manganese mines and a modern 400 ton per hour washing plant

By P. J. Sergeant

London Correspondent, Mining World

The almost complete cessation of Russian exports, the massive expansion of the world's, particularly America's, steelmaking and, more recently, the rearmament drive have radically altered the position and prospects of the producers of manganese ore. The prewar surplus has changed to a postwar shortage. The decline in Russian exports, from

over 1,000,000 tons in 1937 to almost nothing, except to the Eastern European countries, and the increase in the world's steel output from 133,000,000 tons in 1937 to over 156,000,000 tons this year have substantially altered the pattern of imports of the principal users. Both America and the Western European countries have of necessity switched their manganese buying to the Gold Coast and India.

The main line of the Gold Coast Railway is in the foreground. The sintering plant is to the right and a portion of the mine is included by the terraced hillside above the sintering plant.



African Manganese Co., Ltd.

The Gold Coast of West Africa has now become the second largest producer in the world, although working the deposits only began in 1916, and then on a small scale. Almost all of the manganese ore produced there is mined by the African Manganese Company, Ltd., which is probably the largest single producer in the world. The company is British, with headquarters in London, and the chairman and managing director is Mr. D. A. Thompson.

The company's mining operations are in an area of nearly 50 square miles near the town of Nsuta in the Western Province. The Insuta-Dagwin deposits are four miles southwest of Tarkwa and 39 miles by rail northwest of the seaport of Takoradi.

The known deposits crop out along five hills at an altitude between 250 and 600 feet and extend for 2½ miles along parallel ridges. The proved tonnage in the deposits is roughly 10,000,000 with indications of reserves exceeding that figure. At the present rate of exports, some 800,000 tons a year, the deposits should have a life of between 15 and 20 years.

Minerals and Their Origin

The predominating ore minerals are psilomelane and pyrolusite. The ore as mined contains some clay and quartz which are removed by treatment in a washing plant. The manganese content of Gold Coast ores ranges from 40 to 55 percent, and the average content is 48 percent, with 4 to 5 percent iron, 0.12 percent phosphorous, and 4 to 5 percent silica. High grade ore is found in streaks and lenses in the lower grade manganese ore. The ores are found in a series of ancient altered rocks.

Discussing the origin of manganese ores in the Gold Coast, Dr. R. N. Junner, in his report on the Geological Survey Department, 1930-31, says, "From his study of the Nsuta ores the writer believes that they represent ancient deposits of high-grade manganese ores which, in general, have not been modified greatly by vadose waters in recent geological times, and that where the structural features are favorable, the ores are likely to persist in depth."

Openpit Mining

Large scale mechanized methods are used to mine the ore. A series of benches have been developed along the west side from the top of "Hill D" for several hundred feet

GOLD COAST MANGANESE ORE EXPORTS IN TONS FROM 1940 TO 1950 AND DESTINATIONS^{1,2}

Year	United States	United Kingdom	Norway	Canada	France	Belgium	Total
1940	234,522	103,798	30,928	53,907	54,167		477,322
1941	149,120	279,616					428,736
1942	209,750	273,823					483,573
1943	108,551	314,842					423,393
1944	209,514	286,421		8,523			504,458
1945	363,970	283,979	10,000	7,268	11,365	15,237	692,750
1946	377,745	273,523	47,923	42,715	19,252	4,142	765,300
1947	288,996	190,823	72,417	32,003	4,680		588,919
1948	276,947	211,866	114,195	22,125	4,841		629,974
1949	325,394	200,675	100,967	6,674	5,538		639,266
1950	328,099						

1. Nearly all shipments by African Manganese Company, Limited.

2. Sources: Gold Coast Trade Reports; Statistics Survey, Imperial Institute, London.

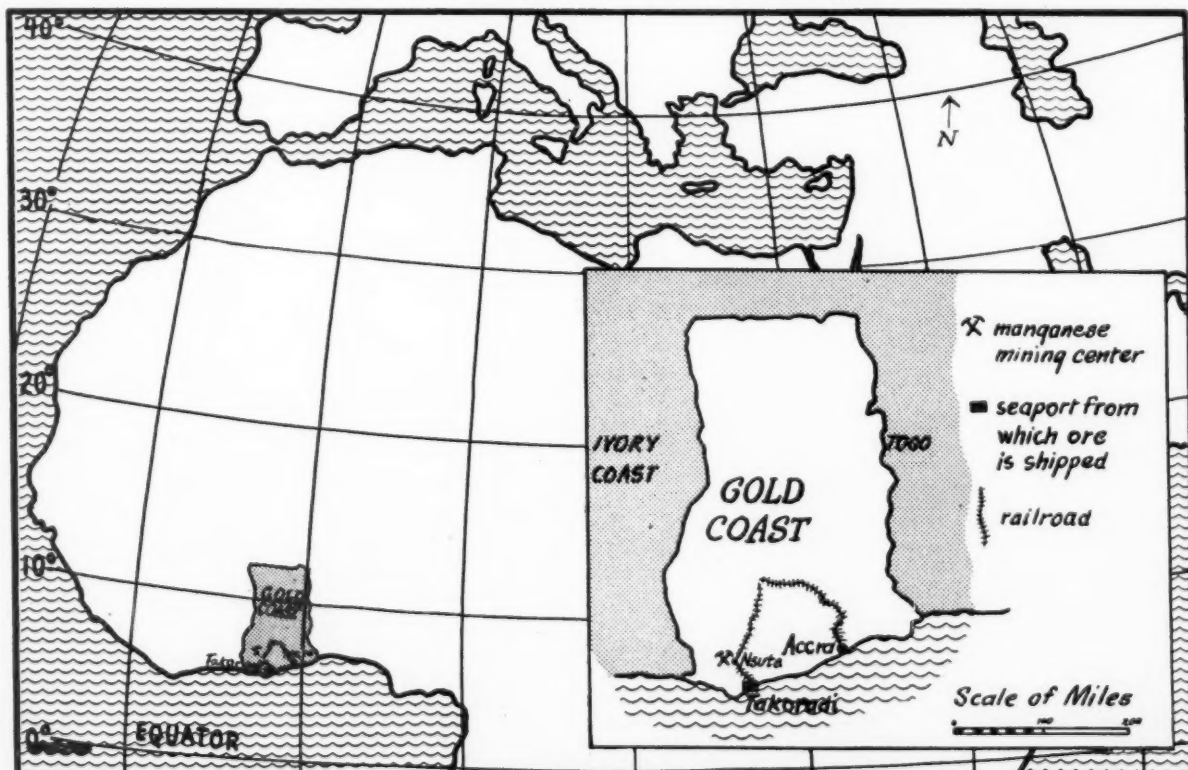
downward. The ore, generally soft, is dug by large Ruston-Bucyrus or Ruston-Erie power shovels and loaded directly into seven-ton capacity steel dump cars. Waste is loaded separately and hauled to waste disposal areas. Trains of 15 to 20 loaded cars are hauled to the washing plant bins below the ore benches by 120 to 140 hp. Diesel locomotives.

Washing Removes Impurities

From the washing plant bins the ore is fed by a Ross chain feeder to a specially designed conveyor belt. The belt delivers the ore to a 36 by 60 inch Pennsylvania-Lehigh single-

roll crusher to which is also fed about 5,000 gallons of water per hour. The crusher discharge is fed directly to an 8 by 16 foot scrubber (blade mill) turning at 18 rpm. The scrubber discharge is to an Allis-Chalmers revolving screen 60 inches in diameter and 20 feet long. The screen is fitted with minus-1-inch, minus-1½-inch, minus-2-inch, and minus-4-inch screens. The minus-2-inch products discharge into an outside screen with ¼ inch openings. The oversize, plus-4-inch product, is delivered to a 20 by 36 inch jaw crusher. The crusher discharge drops onto a 30-inch belt conveyor to which the minus-2-inch and plus-¼-inch material from the

Location of the Nsuta manganese mine in Africa's Gold Coast Colony.





Dumping ore from the openpit into the bins at the washing plant.

60-inch revolving screen is added. This belt discharges to the primary storage bins.

The minus- $\frac{1}{4}$ -inch undersize from the Allis-Chalmers screen goes to a Dorr hydroseparator, the overflow of which flows to two Hydroseal pumps and the underflow to a 28 foot 6 inch Dorr classifier. The classifier oversize drops to a belt conveyor for transportation to dewatering boxes ahead of the log washers.

The plus- $\frac{1}{4}$ -inch and minus-4-inch product is drawn from the primary storage bins and conveyed by belt to a 72-inch-diameter, 24-foot-long revolving screen which separates the ore into three sizes: minus- $\frac{1}{4}$ -inch; plus- $\frac{1}{4}$ -inch and minus- $1\frac{1}{2}$ -inch; and plus- $1\frac{1}{2}$ -inch and minus-4-inch. The smaller material is next screened by a 60-inch-diameter, 20-foot-long revolving screen with $\frac{1}{4}$ inch screens. The oversize falls to a sorting belt where waste is removed by hand with the ore

remaining on the belt for transportation to the final washed-ore bins. The undersize is conveyed to the dewatering boxes as is the minus- $\frac{1}{4}$ -inch from the first 72-inch-diameter revolving screen.

The oversize, plus- $1\frac{1}{2}$ -inch and minus-4-inch product of the 72-inch-diameter revolving screen feeds to a separate sorting belt which

two 6 by 16 foot Hancock jigs. The jig concentrate, about 90 percent of the feed, is delivered by conveyor belt to the final washed-ore bin.

All washed, minus- $\frac{1}{4}$ -inch product goes to the ore drainage bin and forms the feed for the sintering plant, which treats about 500 ton daily.

The washing plant operates 11 hours per day, six days per week. Approximately 400 tons of ore per hour is treated by the plant and about 280 tons of washed-ore is recovered per hour.

Stacking Floor Area

The stacking floor area is located about one-half mile from the washing plant. All plus- $\frac{1}{4}$ -inch ore from the final washed ore bins is transported to it by Diesel-powered trains. Ore as needed is loaded by Diesel shovels into 25-ton railroad cars for shipment to the sea port of Takoradi.

Ship Loading at Takoradi

One of the most important problems in exporting ore is efficient and economical ship-loading. The African Manganese Company has in-

CLASSIFICATION AND ANALYSIS OF
CERTAIN MANGANESE ORES SHIPPED
BY AFRICAN MANGANESE COMPANY, LIMITED

Classification	Percent Manganese	Percent Iron	Percent Silica	Percent Phosphorus
"M" (Metallurgical)	47.0 to 50.0	4.0 to 6.0	5.0 to 7.0	0.11 to 0.14
"J" (Processed Ore)	48.0 to 52.0	6.5 to 7.5	10.0 to 14.0	0.12 to 0.14
"F" (Chemical)	54.5 to 56.5	1.1 to 1.3	2.0 to 3.0	0.10 to 0.12

also delivers the ore from which waste has been picked to the final washed-ore bin.

The underflow (minus- $\frac{1}{4}$ -inch product) of the dewatering boxes is fed to two 25 foot log washers, the oversize from which is fed to

stalled a modern ship-loading plant at Takoradi, which can handle up to 1,000 tons of ore per hour from railroad cars to either ships or storage. Three sections—inloading, outloading and reclaiming—are built round a central storage ground.

View of the washing plant which processes all openpit ore. Clay minerals and quartz are washed from the ore.





LEFT: The minus- $\frac{1}{4}$ -inch washed ore is treated in the sintering plant to produce an ideal blast furnace feed as shown by this picture. RIGHT: A Bucyrus-Erie shovel loads ore from the stockpile for shipment to the seaport of Takoradi.

The manganese ore is transported from the mines in steel cars which are shunted to a track that runs through a car dumper with receiving hopper and apron feeder. The ore is discharged from the cars into hoppers from which it is extracted continuously by apron feeders and delivered to a conveyor system. There it is weighed and loaded from the shuttle conveyor to a loading bridge carried on a gantry which runs the length of the wharf and storage area. This system permits delivery of ore to any hold of a ship or to any part of the storage area. Ore is reclaimed from storage by steam shovels mounted on track-type tractors that load the ore from the pile into hoppers feeding the conveyors.

Employee Benefits

The mine labor engaged by the company consists of about 43 Europeans and 3,800 Africans. The cost of European labor is high. They work one year and are then granted three months paid leave exclusive of travel time. Fares are paid by the company. The African labor does much more than purely manual tasks, and the mine is well known for its liberal attitude toward colored employees. They are trained for senior administrative and technical positions. Large sums are spent on housing, educating and feeding African employees and their families, and trade union organization is encouraged. But, like all European enterprises, the company suffers from the attentions of native agitators. However, the excellent conditions at the mine mitigate the effectiveness of the agitators.

HMS Plant Being Erected

Despite the company's high degree of mechanization, an active pol-

icy of renewal and reequipping is being undertaken. The company has just placed an order with the Fraser & Chalmers Engineering Works of the General Electric Company, Limited for a 100 ton per hour Heavy-Media Separation plant for treating manganese ore.

Acknowledgement

The writer wishes to express his gratitude to Mr. D. A. Thompson, chairman and managing director of African Manganese Company, Limited, without whose kindness and help the article could not have been written.

Loading battery-grade manganese ore at the Nsuta mine. Note the African foreman in the foreground. The African Manganese Company, Limited, uses native personnel in a number of supervisory positions.





An aerial view of the surface plant of the Virginia No. 3 shaft of the Virginia Orange Free State Gold Mining Company, Limited where a world's shaft sinking record was established during April—504.0 feet. The buildings under construction in the lower right foreground will be the living quarters for the unskilled labor force, with the kitchen and native brewery in the lower left foreground. The buildings at the top right are the prefabricated, temporary houses for the European employees engaged in shaft sinking. The families now living in these houses will be permanently housed in the township now under construction on the far bank of the Sand River shown at the top of the picture.

WORLD SHAFT SINKING RECORD SET---504 FEET IN 30 DAYS

In April the Virginia Orange Free State Gold Mining Company Limited set the record at its Virginia No. 3 shaft in South Africa

Profiting from experience gained during March in breaking the world's monthly shaft sinking record by 9.0 feet, crews at the Virginia No. 3 shaft of the Virginia Orange Free State Gold Mining Company, Limited, Union of South Africa, broke their own record in April and established a new record when they sank and concrete-lined the vertical shaft the amazing distance of 504.0 feet.

After the shaft collar and reinforced-concrete lining had been completed to a depth of 80 feet in February, 1951, and all surface equipment installed, actual sinking started on April 1st and in the next 61 days the shaft was sunk and lined 974.0 feet to a total depth of 1,054.0 feet.

Record-Making Men

Supervising the shaft sinking were T. F. Muller, manager; Gordon de Villiers, underground manager, and Martin Tucker, master-sinker. Each of the crews was supervised by a foreman-sinker under supervisory control of the underground manager. The actual sinking crew on each shift was composed of the sinker, the sinker-helper, a Gallo-way-stage man, a "banksman," native "drill boys" and "lashing boys"

(muckers). In April, 80 natives were employed per shift, of which 18 were drill boys and two "boss boys."

Circular Shaft

The No. 3 shaft is circular in cross section with a 24-foot diameter inside the concrete lining. The shaft

was sunk through the Karroo formation, which is found just below the surface soil and gravel in the area. The Karroo is composed of shales, varies from 300 to 2,100 feet in thickness and averages about 1,300 feet. The shales weather easily

Steel forms are shown in place for pouring the concrete collar for a circular shaft. In the foreground is Gordon de Villiers, Virginia's underground manager; in the right background is W. Hinks, assistant mechanical engineer. Also shown are two European riggers and three Native laborers. Note the prefabricated, sectionalized steel rings bolted together making lining forms. Concrete is lowered into the shaft in this distributing bucket. The steel reinforcing rods are used in the concrete shaft lining until the shaft has been sunk below the loose surface gravels, and rock has been entered.



and on exposure to the atmosphere quickly crumble into an ash-gray powder. Not much over 30 feet of unsupported shaft can be sunk through them.

In establishing the sinking record a new system of four cycles of workmen was used. Each group worked an eight-hour shift and then rested for 24 hours before going on shift again. Several other Orange Free State gold mines are sinking shafts with three crews, working eight hours and then resting 16. On the Rand some shafts have been sunk with four crews, each working six hours.

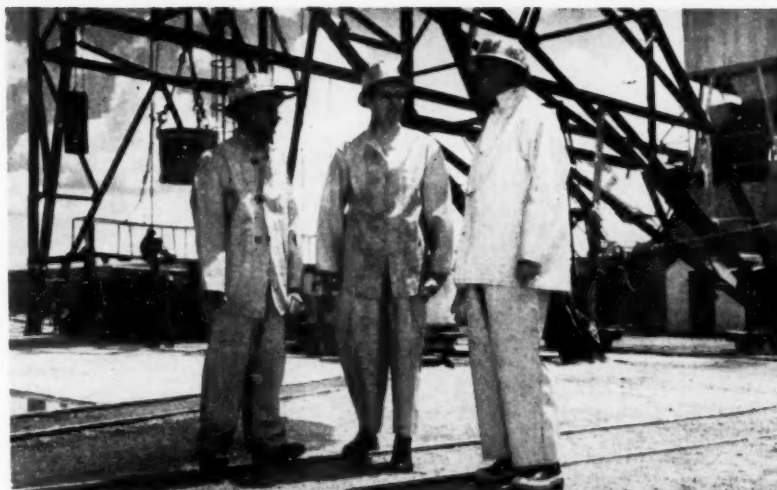
Combined Experience

The record resulted from the combined experience of the technical staff of the Anglo-Transvaal Consolidated Investment Company, Ltd., the Virginia mine staff and the staff of the Merriespruit Orange Free State Gold Mining Company, Ltd. The Kennecott Copper Company has assisted in financing the Virginia and the Merriespruit companies. Virginia has been sinking its Nos. 1 and 2 shafts since October, 1949, and both are now over 2,000 feet deep. Merriespruit is sinking its No. 1 shaft and pioneered the use of some of the equipment used at Virginia. In fact, Merriespruit No. 1 shaft established an Orange Free State record in January, 1951, when it was sunk 351 feet.

Two-Deck Galloway Stage

The use of a new type of two-deck Galloway stage was an important factor in establishing the record.

LEFT: A view of the two-deck Galloway stage which aided in establishing the record shaft sinking and concrete lining at the Virginia No. 3 shaft. The stage, suspended above the shaft bottom, facilitates the simultaneous drilling, mucking, and hoisting (through the rectangular openings shown in the two decks of the stage) while the concrete shaft lining is being poured. RIGHT: Gordon de Villiers, Virginia Gold Mine's underground manager directs the pouring of the concrete collar at Virginia No. 3 shaft. In the background are the concrete distribution box and a bucket of concrete. Concrete is distributed to the forms through the hoses shown in the left foreground.



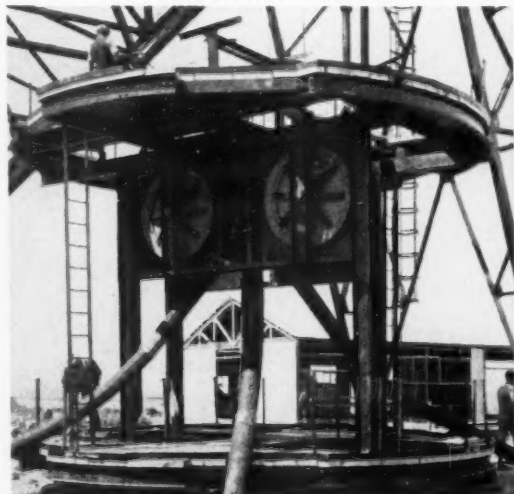
T. F. Muller (left), manager of the Virginia mine, Sir Evelyn Baring, High Commissioner for the United Kingdom in South Africa and the Protectorates (center), and A. Bryant, manager, Harmony Gold Mining Company, Ltd. (right) discuss a trip underground at the No. 1 shaft of the Virginia mine.

By using the stage the concrete lining of the shaft could be placed at the same time and without interfering with other sinking operations, such as cementation of the shaft periphery through drill holes, drilling, mucking, and rock hoisting. The new stage is suspended in the shaft by two wire ropes instead of the four previously used, which not only speeded sinking but also eliminated two stage-hoists with a resultant capital investment saving of between £25,000 and £30,000.

March—Sinking Details

Shaft rounds consisted of 96 holes drilled with one-inch-diameter

tungsten-carbide-tipped bits. The depth of each round was five feet. Holes were drilled with Climax three-inch drifters and two $\frac{5}{8}$ -inch Deimos jackhammers. Every 30 feet a series of pilot holes were drilled to a depth of 40 feet below the shaft bottom to test for water-bearing fissures which have slowed sinking and development of other mines in the area. A series of holes are also drilled around the perimeter of the shaft at a 45° angle. The holes are drilled through casing capped with valves, and if water is found the drill steel is removed and the holes grouted under pressure. The position and number of holes is dependent on the character of the for-



mations encountered. The master-sinker and the foreman-sinkers make on-the-spot decisions as to any changes in the carefully designed sinking plan.

March—Concrete Lining

Segmented steel forms which bolt together are used in lining the shaft. Each segment of a form is two-feet, six-inches deep by six-feet, two-inches long. Twelve are used to make a complete ring. The lowest ring was kept 15-feet above the sinking crew and concrete is poured from the lowest ring upward to the bottom of the previously poured ring. At 15-foot intervals a ring of quick-setting concrete is poured which sets in one hour. Setting time for the other rings is about 10 hours. In some instances the use of concrete hardening agents is necessary. During March 2,000 tons (1,644 cubic yards) of concrete was mixed on the surface, transported down the shaft and implaced behind the lining.

All broken rock and drilling water were hoisted in three-ton capacity buckets. The buckets were hoisted with two hoists, one driven by a 450 hp. Fulton electric motor and the other, a single-drum hoist, was driven by a 200 hp. motor.

In addition to hoisting and lowering the shaft crews, a total of 21,000 tons of broken rock was hoisted from the shaft during March.

April—Deeper Rounds

During April several changes were made in drilling procedure. On each shift a series of six 15-foot holes were drilled vertically from

the shaft bottom to test for water-bearing formations. The depth of each round of holes was increased from five to six feet and the number of holes per round increased from 96 to 116 to "pull" the deeper round.

Seven rings of holes were drilled with an eight-hole cut at the shaft center. Cormorant drill steels (36 per round) with attached tungsten-carbide chisel bits were used. Starters were 1½ inches and seconds 1½ inches in diameter. Drilling time was about one hour in the Karroo formation, comparable to one hour in quartzite and two hours in the lava found in Orange Free State mines at comparable depths. Rounds were blasted toward the end of the shaft with 60 percent powder and seven delays of blasting caps. A six-inch cube was the average maximum size of the broken rock. The round was mucked out in about five hours, filling 90 to 105 three-ton buckets (four used at once with two hoists).

Changes made in the method of concrete lining made it possible to line the 504 feet of new shaft plus the 20 feet of shaft sunk, but not lined, in March. Under the new procedure completed sets of steel ring forms were lowered from the Galloway stage by three winches and three jibs during the period that the bottom was being mucked out. When the bottom was being drilled, concrete was lowered down the shaft and placed behind the forms. Every 35 feet the lowest ring was lowered with chains and placed in position just above the top of the broken

muck pile and immediately filled with quick-setting concrete. While the round was being mucked, as many rings as possible were lowered and set in position for concrete pouring (about one cubic yard per minute) during the drilling period. During April, 22,680 tons of broken rock were hoisted and 2,500 tons (1,952 cubic yards) of concrete were lowered through the shaft. During the latter part of the month a single drum, 450 hp., steam-driven hoist replaced the 220 hp. electric hoist used in March.

Remarkable Record

From a mining and engineering standpoint the Virginia accomplishments are remarkable. Many mines consider a 500-foot per month advance of a development drift as unusual. While the footage is much less than the fastest monthly tunnel-driving record, the conditions are much different and in none of the record-establishing tunnels was it necessary to use any ground-supporting material of any kind. A record undoubtedly has also been established for driving and supporting on all sides an underground opening regardless of its direction.

Of perhaps greater importance than the rate of advance is the cost per foot of shaft, which was about £50 (\$140.00) at the March-April rate of sinking.

Acknowledgment

The photographs have been reproduced through the courtesy of the Anglo-Transvaal Consolidated Investment Company, Limited.

Monthly World's Sinking Records for Round and Rectangular Shafts

Mining Company and Shaft	Location	Feet Sunk	Month	Type	Size	Formation Penetrated	Lining
Virginia Orange Free State Gold Mining Co., Ltd. No. 3 Shaft.	Virginia, Orange Free State, South Africa.	504.0	April, 1951 (30 Days) ¹	Circular	24-foot Diameter	Karoo Shales	Quick setting concrete
Virginia Orange Free State Gold Mining Co., Ltd. No. 3 Shaft	Virginia, Orange Free State, South Africa.	470.0	March, 1951 (31 Days)	Circular	24-foot Diameter	Karoo	Concrete
Van Dyk Consolidated Mines, Ltd. Ventilation Shaft.	Far East Rand, Union of South Africa.	461.0	August, 1941 (31 Days)	Circular (Cecilia type)	15 to 16 foot Diameter as sunk. 14 foot lined.	Witwatersrand Quartzite.	Unlined as sunk.
West Rand Consolidated Mines, Ltd. ² Deep Vertical Shaft	Western corner Witwatersrand, Union of South Africa.	454.0	May, 1940 (31 Days)	Rectangular	.....	.....	Timber lined.
Water Lily Shaft.	Eureka, Nevada.	427.5	September, 1920 (30 Days)	Rectangular	Three Compartment. 5.75 by 15.5 feet.	Porphyry and Limestone	Timber sets.
Crown Mines, Ltd. No. 18 Shaft.	Outskirts of Johannesburg, Central Rand, Union of South Africa.	390.0	July, 1935 (31 Days)	Circular	19'—6" Rock section.	.....	.....
The Randfontein Estates Gold Mining Company, Witwatersrand, Ltd.	Western End of the Old Rand, Union of South Africa.	386.0	August, 1926 (31 Days)	Circular	23'—6" Rock section. 22'—0" Lined.	.....	Concrete.

¹ World's record for a rectangular shaft.

² Four six-hour shifts per day worked.

³ Actually 29 working days due to lost time in replacing one electric hoist with a steam driven hoist.

EUROPEAN NONFERROUS ORE DRESSING STUDY

TEAM VISITS MILLS AND PLANTS IN THE USA

What does a typical European engineer think of the United States and of the ore dressing methods employed by the leading United States' mills and plants?

Impressions and comments of a group of leading specialists gained during their recent extensive American trip are given in this article.—Ed.

For the past several months the Economic Cooperative Administration has brought groups of foreign specialists to the United States. To date about 300 productivity teams have toured some of the largest and most progressive mines, mills, smelters and machinery manufacturing plants in the country to see how the "Americans get the job done so fast." These teams have seen everything, from abaca laying to zirconium beach-sand recovery.

OEEC-54, Nonferrous-Ore-Dressing study team has just completed a six-weeks coast to coast, Gulf to Noranda, Quebec, tour "to study the techniques and machinery used in the United States and Canada in the preparation and dressing of nonferrous and nonmetallic ores." Twenty-six members of this group, representing Austria, Belgium, Belgian Congo, Federation of Malaya, France and colonies, Germany, Greece, Norway, the Netherlands, Sweden, Turkey and the United Kingdom, were divided into three specialized study groups, each under the direction of a project manager. Each group travelled an average of 8,000 miles in the United States and Canada by chartered airplane, scheduled airliner, train and chartered bus to those plants of greatest interest to the members of each group.

How Group Members Picked

The Organization for European Economic Cooperation with headquarters at Paris, France, originated the plans for the trip and requested that each of the participating countries in OEEC submit a suitable list of men to make the trip as representatives of the nonferrous metal-

lurgical companies and machinery manufacturers. Knowledge of English was an important factor in the selection of men by each country. After each country had picked the men to represent it a list of the men was submitted to OEEC for final selection. After the personnel of the group was picked all details of the trip were submitted to ECA for final approval. OEEC furnishes transportation and expenses outside the United States and ECA all transportation and \$12.00 per diem expenses in the United States. After receiving approval for the trip the OEEC arranged all details for individual members and set the time and departure date from Paris.

Tour in the United States

Plants and mills in the United States visited by the General Group (ores and minerals other than lead, zinc, copper and pyrite) included: Separations Engineering Corporation, Jersey City, New Jersey; Stamford Research Laboratories of the American Cyanamid Company, Stamford, Connecticut; The Dorr Company laboratories, Westport, Connecticut; mineral dressing laboratories, School of Mines, Columbia University, New York, New York; U. S. Bureau of Mines laboratory, College Park, Maryland; American Zinc Company, Mascot, Tennessee; Tennessee Copper Corporation, Copperhill, Tennessee; the Feldspar Flotation Corporation, United Feldspar Company, Harris Clay Company and Montague Mica Company mills in North Carolina; Minerals Research Laboratory, Asheville, North Carolina; International Minerals & Chemical Corporation, Bartow, Florida; United Clay Mines, Hawthorn, Florida; Edgar Brothers, Edgar, Florida; Dupont Company's Trail Ridge ilmenite plant, Starke, Florida; National Lead Company, Titanium Division, Jacksonville, Florida; Republic Steel Company, Spalding, Alabama; Shook and Fletcher Supply Company, Russellville, Alabama; Columbia Tennessee Phosphate Section, Tennessee Valley Authority; Ozark Mahoning Company, Rosiclare, Illinois; St. Joseph Lead Company, Bonne Terre,

Missouri; Yuba Manufacturing Company, Benicia, California; Capitol Dredging Company, Capitol No. 4 dredge, near Folsom, California; Yuba Consolidated Goldfields, Biggs No. 3 dredge, Biggs, California; Central Eureka Mining Company, Sutter Creek, California; Allis-Chalmers Manufacturing Company, and Dings Magnetic Separator Company, Milwaukee, Wisconsin; Silica Company, Ottawa, Illinois; Republic Steel Corporation, Mineville, New York; and the National Lead Company, McIntire Division, Tahawus, New York.

Impressions and Comments

With the members of the group having such a varied background and with several in the group who had specialized experience with only one mineral it is natural that impressions and opinions on what they had seen in the United States varied widely. However, the one point of unanimity of thought was that the Grand Canyon of the Colorado River in Arizona as viewed from an airplane was the highlight of the trip.

One engineer with wide experience in Africa was impressed with the availability and cheapness of electric power in the United States, and the widespread use of individual-drive electrical motors in metallurgical plants. He was quick to add that Diesel fuel was readily available in Africa and that the hydroelectric power potential in some mining areas had been fully developed. Erection of new power plants and construction of long transmission lines necessary to increase the electric power supply was not practical due to the uncertainty and fluctuation in the demand and price for metals.

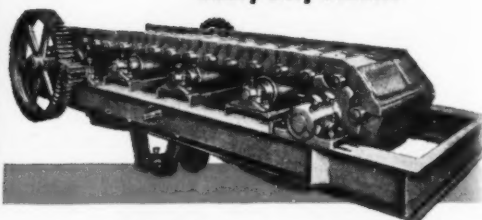
Another engineer said that increased production of tin and columbite had been slowed by the fact that the necessary additional United States-built equipment was not available. The "DO priority system" would not permit his company to purchase and take delivery on large gravel and dirt moving equipment.

TELSMITH

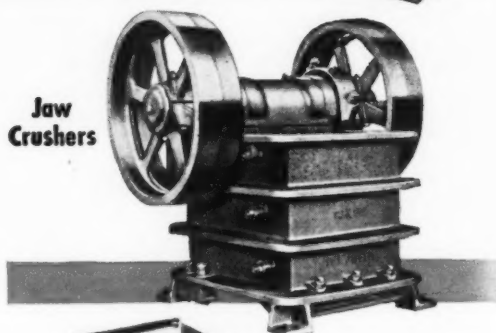
feeding
coarse crushing
screening
fine crushing

EQUIPMENT FOR MINES

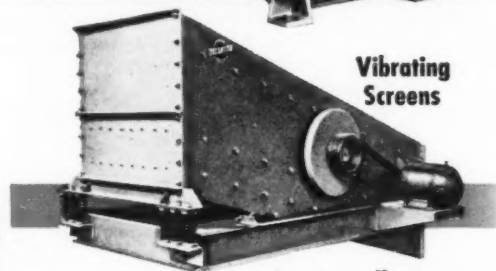
Heavy-Duty Feeders



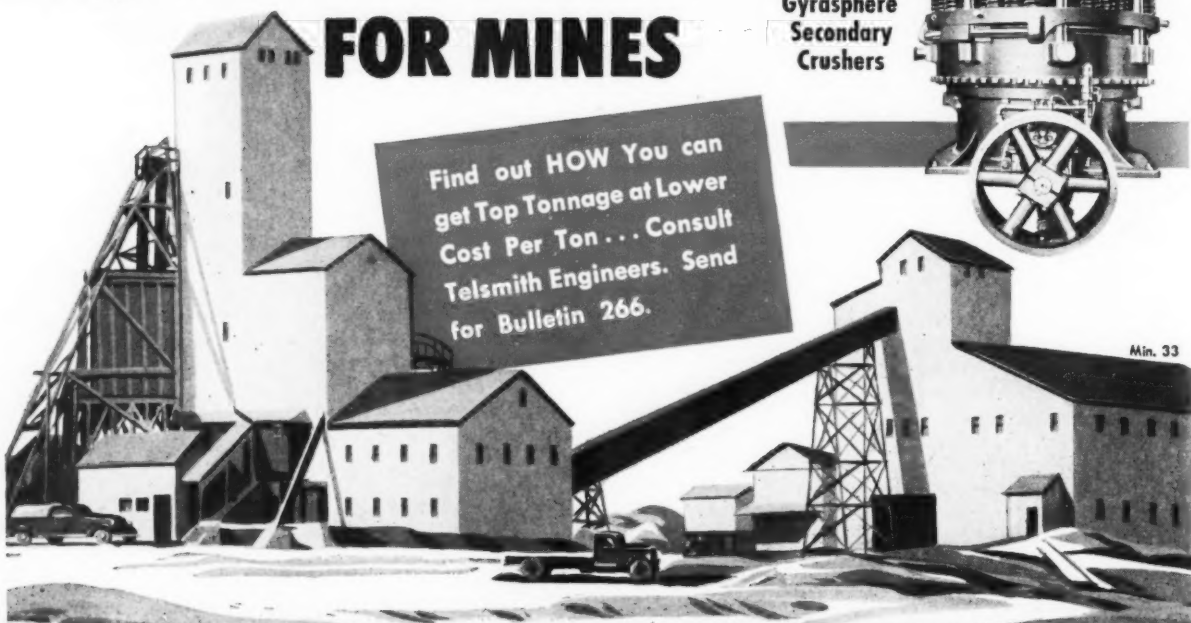
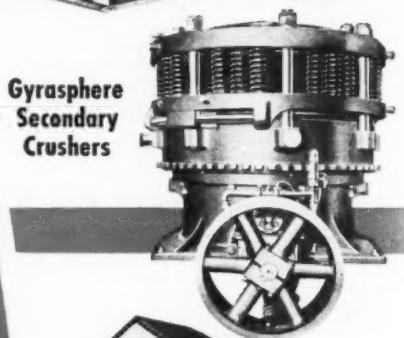
Jaw
Crushers



Vibrating
Screens



Gyrasphere
Secondary
Crushers



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Spokane 1, Wash.

Clyde Equipment Co.
Portland 9, Ore. Seattle 4, Wash.

The Sawtooth Company
Boise, Idaho

Montana Powder & Equip. Co.
Helena and Billings, Mont.

Gordon Russell, Ltd.
Vancouver, B. C.



The Nonferrous-Ore-Dressing Study Team visits the Benicia, California, manufacturing plant of the Yuba Manufacturing Company and inspects a Yuba M-8 Placer Jig crated and bound for the Goodnews Bay Mining Company, Inc. at Platinum, Alaska. Standing in front of the crate, from left to right, are: Herb Sawin, sales engineer, Yuba Manufacturing Company, San Francisco; Leslie A. White, project manager, ECA, Washington, D.C.; Holman J. Arneson, production manager, Yuba Manufacturing Company, Benicia, California; Willy Finn, manager of the research station, Fried Krupp, Stahlbau, Rheinhausen, Germany; Percy Carmer, sales engineer, Yuba Manufacturing Company, San Francisco; Francis B. Michell, head, Department of Mineral Dressing, Camborne School of Mines, Camborne, Cornwall; Frank H. Cothay, engineer-consultant, London Tin Corporation, Ltd., London, England; Harry W. Hockin, inspector of mines, mineral dressing research, Mines Department, Kuala Lumpur, Federation of Malaya; George Westerberg, superintendent Benicia plant, Yuba Manufacturing Company; Anen Boe, managing engineer, A/S Knaben Molybdaengruber, Knaben Gruvor, Norway; Levi K. Sundelin, mill superintendent A/S Titania, Hauge I, Dalane, Norway; Francois Collot, chief, Services des Mines, Yaounde, Cameroon, French West Africa; Andree Bruneau, manager of tin ore washery, Geomines Company, Manono, Katanga, Belgian Congo; Magne Mortenson, assistant professor in ore dressing, the Technical University of Norway, Trondheim, Norway; and Dean Elshire, general foreman, Yuba Manufacturing Company, Benicia. Standing on the crate, from left to right, are: Frederick Reynolds, senior scientific officer, Chemical Research Laboratory, Teddington, Middlesex, England; Pierre Van Beirs, manager, ore dressing and coal flotation, Societe Generale des Minerais, S. A., 31 Rue du Marais, Brussels, Belgium; Francis J. Quinchan, chief engineer, Preparation Industrielle des Combustibles, Fontainebleau, France; Daniel Bedouret, deputy chief, Technical Department, French Overseas Territories Bureau of Mines, Paris, France; Leon V. Ter Davtian, administrative officer, Programs Division, OEEC, Chateau de la Muette, Paris XVI, France; and Roger J. Testut, assistant technical manager, Minerais et Metaux, 28 Rue Arthur-Rozier, Paris XIX, France.

Still another metallurgist from Africa was interested in seeing how United States' plants recovered and used mica. He hoped to help develop a local market in Africa for the large amounts of scrap mica his company was discarding.

Many in the group saw, for the first time, Humphreys spiral concentrators and Dorr-Clones in operation. The heavy beach-sand recovery plants in Florida were of particular interest from a gravity concentration standpoint.

Comments on Specific Plants

The Noralyn phosphate plant of the International Minerals & Chemical Corporation in Florida was of special interest to the group because of the widespread use of automatic controls.

The magnitude of the St. Joseph Lead Company's southeast Missouri lead mining and milling operations was a surprise to several of the group, and one engineer added "the size of the conveyor belt and the

amount of ore it carried into the St. Joseph mill was the most impressive sight of the trip."

Many favorable comments were made about the research and testing program at the Copperhill, Tennessee, mill of the Tennessee Copper Company.

The United States' Workman

Several of the group were outspoken in their belief that the European workman is as skilled as the American and that it was only because of the high degree of mechanization that output per man in the United States was so much higher than in Europe. However, at least part of the effectiveness of the American was credited to his complete faith in the capitalistic system and the opportunities it gives him.

Some were impressed with the employee team spirit. Others commented how freely workmen talked to their foreman and to one another about plant operations. The use of time and motion studies in the

United States which lead to increased production was an eye-opener to several of the engineers.

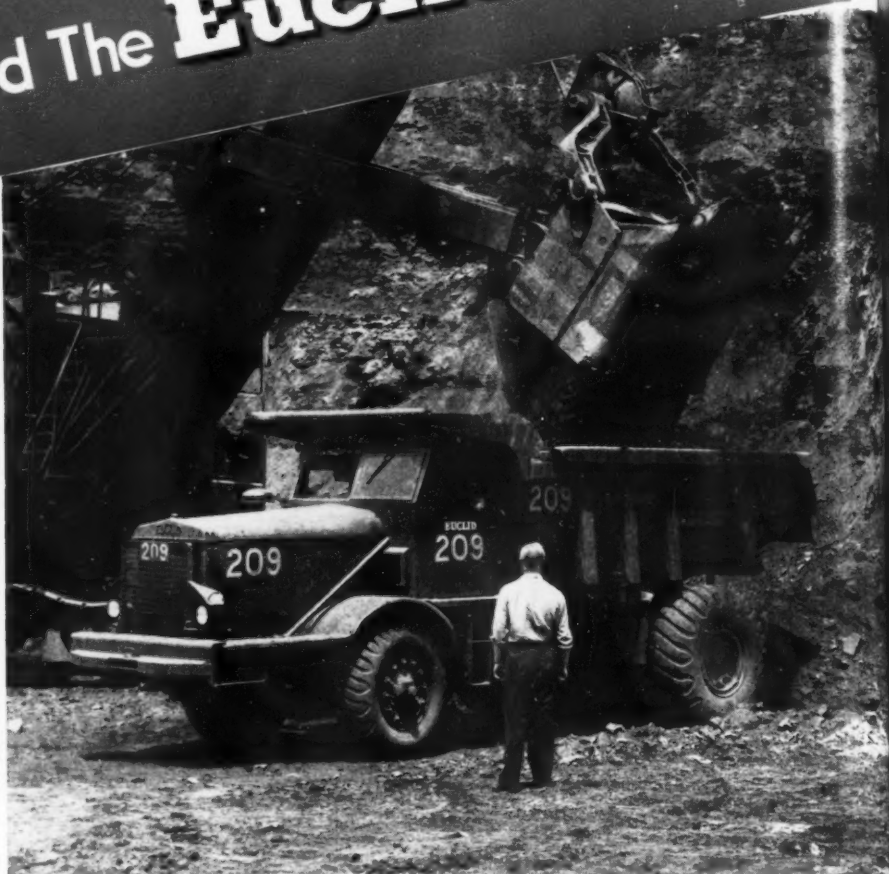
United States Machinery

Both the operating group and the machinery manufacturing group were of the same opinion about certain equipment made in the United States, i.e., Europe couldn't make, or even compete in the manufacture of large crushers, Caterpillar tractors, electric shovels, off-the-road trucks, high-speed, rubber-tired, self-loading and carrying equipment, large draglines and churn drills.

Most Surprising Comment

The one item which surprised them the most was the automobile traffic in the United States. Not the number of automobiles, but the slow speed at which they were driven. All were loud in their praise of the wide, straight, and well surfaced highways but were quick to point out that in Europe automobiles were driven much faster despite the narrower and poorer roads.

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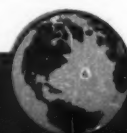
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ACTIVITIES OF INTERNATIONAL MINING MEN

Dr. Fritz Brotzen of Stockholm, Sweden, has been appointed associate editor for Contributions from the Cushman Foundation for Foraminiferal Research, Washington, D.C., for the next three years.



WILLIAM D. LORD, JR. has been appointed general manager of mines of the International Mining Company, controlled by W. R. Grace & Company of New York, with operations in Bolivia. He had been serving as acting manager since

December 1950 and succeeds George D. Bellows who resigned to return to the United States. Lord received an E.M. degree from the Colorado School of Mines in 1944.

Sir Ernest Oppenheimer earlier in the year resigned from seven directorships in companies operating in South Africa, and he has now resigned from eight more. These are the Blyvooruitzicht, St. Helena, Spaarwater, Rand Leases, and Libanon gold mining companies, the African Metals Corporation, the Vanderbijl Engineering Corporation and the Union Lime Company. However, through his capacity as chairman of Anglo American Corporation, of De Beers Consolidated Mines, Ltd., and certain financial and copper-producing companies in Northern Rhodesia, he still maintains a close personal interest in the diamond, gold and copper mining industries and associated industries of the area.

Charles Will Wright recently spent two weeks in Mexico discussing plans for the October joint meetings in Mexico of the Third Congress of the Pan-American Institute of Mining Engineering and Geology and of the AIME, the G.S.A., and the S.E.G. The meetings will be held from October 28 to 31, after which there will be three-day excursions. An interesting program has been planned and attendance is expected to be large.

Dr. C. O. Swanson, chief geologist of The Consolidated Mining and Smelting Company of Canada, Ltd., has been awarded the Blaylock Medal of the Canadian Institute of Mining and Metallurgy. The award was given to Dr. Swanson for distinguished service to Canada in the field of geology, in particular for his outstanding method of making quantitative expressions of geological probabilities for use in the control and direction of mining operations and mining exploration.

C. Stewart Parsons, O.B.E., director of the Mines Branch, Department of Mines and Technical Surveys at Ottawa, Ontario, Canada, was awarded the Inco Platinum Medal recently. The presentation was made by **Dr. John F. Thompson**, chairman and president of The International Nickel Company of Canada, Ltd., for meritorious contribution of outstanding importance to the mining and metallurgical industry.

Jack Cowley, mining engineer, who has been employed for the last several years as mining advisor to the Etibank, Ankara, Turkey, has returned to the United States. Mail may be addressed to him c/o Vermont Copper Company, 120 Broadway, New York 5, New York.

Professor Olaf Holtedahl, of Oslo, Norway, has been awarded this year's Wollaston medal for research on the mineral structure of the earth, especially on the Lower Palaeozoic rock of Norway, on Caledonian structural problems, and on geomorphology.

Dr. Ichiro Hayasaka has been elected president for the year of the Geological Society of Japan. He had been professor of paleontology and head of the geology faculty at the University of Formosa for 20 years and is now professor at the University of Hokkaido. The Society held its 58th annual meeting at Kyoto recently, attended by several U. S. Geological Survey men.

Sayed Abdul Ahad, under secretary to the Afghanistan Ministry of Mines, has been touring the United States studying mining methods. In Afghanistan most mining is done by hand, he said, although rails and mine cars were installed at coal mines two years ago. Afghanistan now has two coal mines, two lead mines, one chromite and one zinc mine operating among several other mines containing less important metals. The United States has received 1,000 tons of chromite from

the country in the past year.

Ronald L. Prain, O.B.E. of London has been elected a director of the International Nickel Company of Canada, Ltd., according to an announcement made by Dr. John F. Thompson, chairman and president of the company, New York. Mr. Prain is a director of several other companies including the Rhodesian Selection Trust, Ltd., Mufulira Copper Mines, Ltd., and Roan Antelope Copper Mines.

E. H. Bode has resigned as metallurgical engineer to Eastern Smelting Company, Ltd., Penang, Malaya, and has returned to Australia.

Dale F. Coleman, Australian technical representative of the Gardner-Denver Company, is now in the U.S.A. on a three month visit.

Eugene Claeys, in charge of production at the tin mine of Cie Geomines, Belgian Congo, West Africa, was on the Mesabi range of Minnesota, U.S.A. in March. His object was to study the methods employed in drilling, blasting and crushing rock.

K. D. McBean of the metallurgical division of The Consolidated Mining and Smelting Company of Canada, Ltd., is on a business trip to England, France and possibly Italy. He will act as metallurgical consultant on suspension roasting to the Societe Miniere et Metallurgique de Penarroya and St. Gobain Chemical and Metallurgical Works.



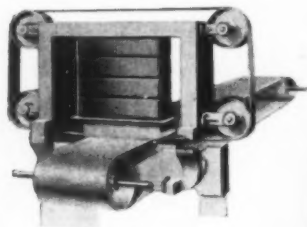
FRENCH METAL PRODUCERS VISIT U.S.

At Perth Amboy, New Jersey, French producers of nonferrous metals visited the National Lead Company plant. Shown listening to an explanation of the metal production there are (left to right) Clifford De Leon, National Lead's chief chemist; Victor Arrillaga, scrap sorter for the Societe L. & M. Fauveau at Colombes, France, an aluminum company; Lucian Ott of the Affinerie de Bezons, a copper base alloys and aluminum refinery; an unnamed interpreter; Jacques Spirytus, engineer of the Affinerie de Juvisy; Nick Muccilli, National Lead assistant superintendent; and Andre Copin, general manager of the Affinerie de Bezons. There were a total of 15 men in the group of Frenchmen who visited the United States. Secondary non-ferrous metal smelting and refining production in France ranges from 1,100 to 15,000 tons yearly for each of about 140 plants.

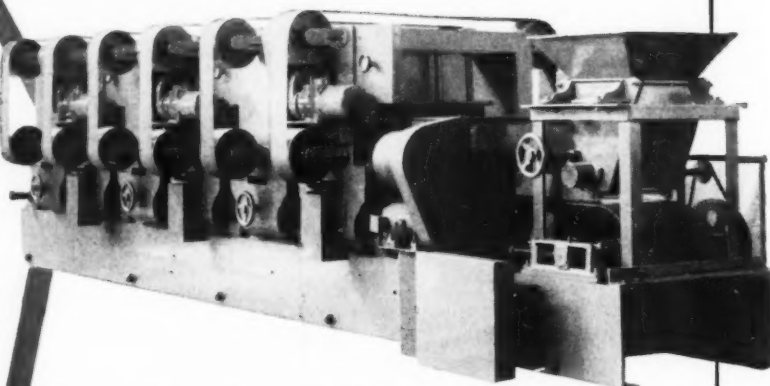
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**to the Concentration and
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MORE selectivity and greater capacities in the concentration of magnetic ores than were heretofore possible are now obtainable with the new Dings Cross-Belt Magnetic Separator. Here are typical examples: A tungsten mining company in N. Carolina recovers 98% of a 72.2% grade WO_3 in their hubnerite ore. In McCall, Idaho, a 6 Cross Belt unit produces 550 lbs. of monazite concentrate per hour at 99.1% purity from an estimated feed of 2500-3000 lbs. of sand per hour.

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GREATER CAPACITY. New pole nose construction gives separating capacity about double that of any previous design. *Hence with this improvement, a smaller, less expensive unit will often handle requirements.* For example, under certain conditions, a new 3 Cross Belt Unit installed to concentrate manganese will do the work of a 6-belt unit of the old design.

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INTERNATIONAL NEWS

ALUMINIUM LIMITED RECORDS MAJOR PROGRESS IN 1950; PLANS FURTHER EXPANSION

An accounting of the holdings and expenditures throughout the world of Canada's Aluminium Limited appeared in the company's annual report and also revealed future plans as follows:

In Canada, where 13,500 persons are employed, the company spent about \$7,600,000 in 1950 for additions to fixed capital and new investments. The principal subsidiary, Aluminum Company of Canada, Ltd., began building a 250,000 hp. hydroelectric generating plant on the Peribonka River of Quebec to support an annual production of 65,000 metric tons of primary aluminum. Cost of this project upon completion in 1952 will be about \$45,000,000. A second Peribonka River project to cost \$60,000,000 and providing for a 200,000 hp. hydroelectric plant and aluminum ingot facilities has just been announced. Another project to cost \$160,000,000 will provide for the construction of power facilities and processing plants for the production of 150,000 metric tons of aluminum a year at Kitimat in northwestern British Columbia. A new research laboratory at Arvida, Quebec, was finished. It cost \$1,000,000.

In the United Kingdom, where 8,000 are employed, the company spent \$2,400,000 in 1950. Further research facilities are being added at Banbury, and the Northern Aluminium Company, another subsidiary, opened a \$15,000,000 rolling mill at Rogerstone, South Wales. No special expenditures were reported made in Continental Europe, where 3,000 are employed.

In British Guiana and the Caribbean area, where 4,000 are employed, operations continued at Demerara Bauxite Company, Ltd.'s mines at Mackenzie, British Guiana, and Aluminium Limited spent \$650,000 toward construction of an aluminum plant and facilities at Jamaica Bauxites, Ltd.'s mines.

In India and Brazil the company spent \$6,900,000. In India, Aluminium acquired 35 percent of the capital stock of the Indian Aluminium Company, Ltd., which produces alumina and aluminum and operates bauxite mines in the Calcutta region. In Brazil a further interest was acquired in Aluminio do Brasil, S. A., which has utensil and foil works at Sao Paulo. Also, an interest was obtained in the only South American aluminum smelter, Electro-Quimica Brasileira S. A. near Ouro Preto, which ceased aluminum production in 1946 and has been producing ferromanganese instead. This smelter is being reactivated for the resumption of aluminum production.

Within the last two months, reports have been received from Caracas that the company will extend its interests in Latin America to Venezuela where Aluminium, Ltd., has been investigating, with the approval of the government, the possibilities for the construction of an aluminum reduction plant in the Orinoco

region. If this proposal, now only in the preliminary stage, is carried out, bauxite from the Guianas could be used, construction of the plant would take about five years, and power would have to be supplied by a 250 kw. plant, which would be installed on the Caroni River (now being considered with the object of providing power for Venezuela's proposed new steel mill). The power plant alone would cost about \$50,000,000.

In Africa, the company employs 1,200 people and spent \$2,000,000 during 1950 to construct bauxite mining, drying and shipping facilities on the Island of Kassa, French West Africa.

In the past five years, Aluminium Limited has spent \$92,000,000 for additions to fixed capital and new investments. In the next five years the company expects to spend an additional \$55,000,000. As far as development is concerned, further possibilities are a power and smelter project in Africa's Gold Coast.

India Plans Increased Manganese Output

Increases in manganese and ferromanganese production are forthcoming in India, where one company expects to build a ferromanganese plant and another will raise ore production capacity. The United States firm, Brainard International Company, has concluded negotiations with the Government of India to install a \$2,100,000 smelting plant at Orissa with a capacity of 25,000 tons of ferromanganese annually. The plant will be completed about the end of 1952, and an Indian company will be registered to contribute up to 49 percent of the capital.

Increased ore production is planned by the Shivrajpur Syndicate, Ltd., which will further mechanize its mines and which has reopened the Mamankua group of manganese mines. During the year ended November 30, 1950, the company produced 36,054 tons of manganese ore, compared with 13,673 tons in 1949. The company has arranged contracts with buyers in the United States and Continental Europe for 175,600 tons, or about 75 percent of estimated output for the next three years.

Italian Quicksilver Output Rising

Current production of quicksilver in Italy is substantially higher than the average in 1950 of about 150 tons of metal per month. Stocks are probably rather low at the present because of the record exports in 1950 of around 4,000 tons.

The outlook for further sizeable increases in production appears promising, according to Signor Malvezzi, general manager of the Monte Amiata Company,

Italy's largest quicksilver producer (about three-fifths of Italian output). He advised that further deposits of quicksilver have been found in the Mount Amiata region; that skilled manpower is available; and that production per man would continue to rise because of a continuous program now in effect to improve working conditions and methods in the mines.

British Establish New Tunnelling Record

A new British rock tunnelling record was set during the week ending March 18, 1951 when 30 men working in three eight-hour shifts drove 313 feet in seven days through the hard diorite of Cobbler Mountain in Scotland. This is the first time that a footage of over 300 feet has been achieved in Britain in one week, and thus the record established a new milestone for British rock tunnelling.

The men were driving a seven by seven-foot tunnel, which will eventually be 6,000 feet long with an entrance 1,300 feet above sea level. The contractors that set the new record are Edmund Nuttall, Sons & Company (London) Ltd., and the work is being carried out for the North of Scotland Hydro-Electric Board.

The previous record was set in Lancashire by another firm and was 27 feet short of the new record.

Two More Uranium Plants Being Built in S. Africa

The Stilfontein Gold Mining Company and the West Driefontein Gold Mining Company, Limited, are installing uranium by-product recovery plants at their gold mines in the Union of South Africa. These plants will be in operation by 1953 and bring to six the number of uranium by-product plants under construction in the Union. Stilfontein owns 5,560 claims east of Western Reefs in the Klerksdorp area on the West Rand, and West Driefontein owns 4,769 claims adjoining Blyvooruitzicht on the east. The location and report on Western Reefs and Blyvooruitzicht mines was first reported in February *Mining World*.

The Atomic Energy Board of South Africa will loan the two companies money to build the plants. The price received from the Board for the uranium output will be related to the cost of production on a basis which will insure the redemption of the capital cost of the plant over the 10-year life of the contract; it allows a reasonable profit to the companies.

Russian Control Grows in Balkans, Czechoslovakia

The Russian Government has created a Central Mining Office in Budapest which will supervise mining operations in Czechoslovakia, Hungary, Roumania, and Bulgaria, ostensibly in order to give the various countries technical assistance and to supply them the necessary equipment

INTERNATIONAL

and machinery of which they are short. Actually, through the new Office, Moscow is trying to control the output and the ore trade in the Danube countries, since a stipulation has been made that the technical assistance and the equipment and machinery supplied by U.S.S.R. to Balkanic mining is to be paid with the export of ores to Russia.

All of the uranium resources discovered in Czechoslovakia, Roumania, and Hungary will be operated directly from the Russian Mining Office in Budapest through its own engineers. However, from Sophia comes word that important radioactive ore resources have been discovered in Bulgaria in the Rhodopes mountains and that the Bulgarian government has created a state-controlled mining company to exploit the uranium and also some large chrome discoveries in the Dimidovo (southern) area. The company is capitalized at 500,000,000 levas. Assistance in development of the mines, however, will be provided through the technical co-operation of Eastern German mining experts, and Russia will send mining machinery.

COMINCO Announces New Mine Projects in Canada

The Consolidated Mining & Smelting Company of Canada, Limited, has development projects under way to cost a total of \$62,800,000. Among these projects is a recently announced \$30,000,000 project to build a power plant with four units, of which the first two units will have a 205,000 hp. capacity, and a dam on the Pend Oreille River, British Columbia, representing the biggest single construction job undertaken by the company in its 45-year history. The dam will be about 200 feet high and will be close to the point where the Pend Oreille empties into the Columbia at Waneta. Completion of the plant is scheduled for the end of 1953. A 170,000-volt power line will be built from the power plant to Trail.

The company also plans to bring the H. B. zinc-lead-silver mine near Salmo into production in the next two years at a

cost of \$2,750,000. A 4,000-foot haulage tunnel to the orebody will be driven and a 1,000-ton concentrator together with necessary plant buildings will be erected.

A reinforced-concrete loading dock to cost \$75,000 will be built on the precipitous shore of Galena Bay adjacent to the company's Bluebell mine at Rondel. The dock will have a reinforced-concrete deck 160 feet long by 65 feet wide, and concentrates from the Bluebell concentrator will be stored at and shipped from the dock.

In Northwest Territories, in the Great Slave Lake country, the company plans to press mining development as a result of promising exploration reports by the company's geologists and engineers. Lead and zinc deposits have been found, but railroad construction will probably be required to make economic operation possible.

New Peruvian Mining Code Established

At the first of the year, certain fundamental conditions in the Peruvian Mining Code were established as follows:

1. For 25 years there will be no exportation taxes on any metal, mineral or mineral product. (Article 53.)
2. Without specified limit of time, there will be no import duties on equipment or machinery imported exclusively for mining or metallurgical operations. (Article 242.)
3. The taxes affecting mining enterprises will be (a) the Mining Claim Tax, which is a yearly charge per hectare (2.47 acres) of S. o. 1.50 (U. S. \$0.10) for gold properties, (b) of S. o. 20.00 (U. S. \$1.333) for all other metaliferous properties, and (c) of S. o. 7.50 (U. S. 0.50) for non-metallics such as lime, marble, granite, and including coal. The payment of the ordinary Industrial and Commercial Income Tax without excess profit tax also must be made. (Article 50, paragraph 1, and Article 53.)
4. All other taxes that existed to January 1, 1951, or that might have been created in the future, are rescinded, including specifically the former export

taxes on metals, minerals, and mineral products, on the disoccupation taxes, and the excess profits taxes. (Article 53.)

5. Certain tax reductions are allowed. From the net sales price value of the metal, minerals or mineral products of each fiscal year, a sum not to exceed S. o. 800,000 (U. S. \$53,334) is deductible from earnings before calculating the amount of the income tax (Article 50, paragraph 4).

6. Certain percentage depletion allowances are allowed. A depletion allowance of 15 percent of the gross value of the products extracted yearly is conceded freedom from all taxation excepting the very nominal mining claims tax. This law is in recognition of the wasting nature and consequent exhaustion of the mineral capital assets of a mining enterprise (Article 54).



TURKEY—In late 1950, laboratory tests were conducted on ore from a new sulphur deposit at Keciburlu, where Turkey has been getting its sulphur for some years. Flotation tests proved very successful, and preliminary specifications have been prepared for a flotation plant to produce 10,000 tons of sulphur concentrates yearly. Tenders have been asked from companies for the proposed installation.

INDIA—The *Indian Rare Earths, Ltd.*, is being set up at Alwaye in Travancore by the Governments of India and Travancore to run a plant now being installed to process 1,500 tons of monazite sands yearly. As reported in MINING WORLD in September, 1949, the *Societe de Produits Chimiques des Terres Rares* of France is installing the plant and con-

Continued on Page 48

THAILAND WILL USE JEEP FOR PROSPECTING PROJECT THIS YEAR



Mining engineers will use this Willys jeep and its built-in drill while searching for deposits of tin, lead, zinc and coal in the trackless jungles of Thailand. A supply of auger drills is carried on the jeep's front bumper. The jeep's 4-wheel drive will enable the engineers to get through the jungle and its engine will supply power to operate the drill. The rig is part of \$500,000 worth of equipment which the Economic Cooperation Administration is providing this year to aid the Thai government in modernizing its mining industry and to help it relieve a critical fuel shortage. ECA Officers Edward Herman and Samuel Bitting are shown with members of the Thai Embassy.

THE MARKET PLACE

IMPORTANT ANNOUNCEMENT

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50-HP Motor

Allis-Chalmers 9"x15"
JAW CRUSHER

Allis-Chalmers 12"x24"
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Allis-Chalmers 18"x10"
CRUSHING ROLLS

BALL MILLS

1-6x6 ALLIS-CHALMERS
1-6x5 ALLIS-CHALMERS

HERRINGBONE GEARED TO DIRECT
MOTOR DRIVES
100 H.P. MOTORS

2-5x6 ALLIS-CHALMERS
GRID DISCHARGE HERRINGBONE
GEARED TO DIRECT MOTOR DRIVES
75 H.P. MOTORS

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DORR 54"x17' DUPLEX

DORR 4'x20' SIMPLEX

WEMCO 6'x27'x12' BOWL
Model BH BB

MINE HOISTS

DENVER DOUBLE DRUM MINE HOIST
7500 Lbs. at 500 Ft. Per Minute, 150-H.P. Motor
72" DRUMS, 48" FACE, 3000' CABLE

DENVER SINGLE DRUM MINE HOIST
40" Drum, 5" Flange, 15" Face; 52-H.P. Motor

COMPRESSORS

20"x12"x16" INGERSOLL-RAND Imperial Type 10
150-H.P. Motor

15"x9"x12" INGERSOLL-RAND, 100-H.P. Motor

15"x9"x12" INGERSOLL-RAND, 60-H.P. Motor

50,000 feet pipe 2 inch to 8 inch, valves, fittings, etc.

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Various Sizes
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14" - 16" - 18" - 24 BELT CONVEYORS
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48"x8' SCREEN, 5' SCRUBBER
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DRILL STEEL
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24" WOOD PLANER
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CORRUGATED STEEL COVERED BUILDINGS — LARGE QUANTITIES HEAVY TIMBERS — LUMBER — TRAMWAY WITH
TRESTLES — EXTRA LINERS FOR MILLS — SPARE PARTS — SUPPLIES — ETC., ETC.

NOTE: Most of this equipment is in exceptionally fine condition, some being in use less than 1 year. Electric current
440 volts, 60 Cycle (3 Phase).

ALL MACHINERY AND EQUIPMENT PRICED FOR IMMEDIATE SALE!

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If you contemplate liquidating or want to sell outright for cash contact us. Take advantage of our
forty-five years' experience, our large organization is available to you. J. J. Sugarman Co.

BILLITON MINES



3 LeTourneau Rear-Dump Haulers perform so well in South American mine that owner brings in 6 more



Deep in the tropical jungles of Surinam, Billiton Mines of Paramaribo operates an extensive bauxite pit and mill 24 hours a day, the year around. They are stripping clay overburden from ore deposits and hauling bauxite rock to crusher.

On this multi-handling work, Billiton Mines had always hauled both their overburden and pit ore in shovel-loaded, narrow-gauge rail cars. Last winter,

however, to maintain profitable output as operations were extended into new areas where haul grades were steeper, they turned to LeTourneau rubber-tired, rear-dump Tournarockers. These rear-dump trucks easily climb the 10% slopes which the locomotives could not negotiate, and, despite extreme equatorial heat and very heavy rains (120 inches annually), keep production on schedule.

1500-ft. cycle every 6 minutes


When these photos were taken, Billiton Mines was using 3 of these 16-ton, rear-dump haul units to remove 20 feet of heavy, wet clay overburden. Shovel-loaded, each Tournarocker carried 15 cu. yds. per trip — made 10 trips an hour on 750 ft. one-way haul up 10% grades. That's 150 cu. yds. per unit per



R. G. LeTOURNEAU, INC.

HIGH-SPEED, RUBBER-TIRED HAULING • EXCAVATING

triples Tournarocker fleet



Under 2-yd. shovel, Tournarocker's 12'5" x 8' top opening provides big target for fast loading. Giant 21.00 x 25 low-pressure tires give ample flotation and traction for pulling out of wet, muddy pit.

With ample horsepower for big loads, Tournarocker has plenty of power to haul through deep mud and up slippery 10% grades from pit to dump.

hour, and a combined output for the 3 high-speed Tournarockers of 450 cu. yds. hourly.

Performance of these 3 units has been so satisfactory under extremely adverse working conditions that Billiton Mines has added 6 more Tournarockers to their fleet. Upon completion of stripping, the 9 units will haul bauxite ore 1 mile from pit to mill.

Whether you are moving clay, gravel or rock, this advanced earthmoving equipment can mean lower costs and increased production on *your* mining operations, too. Tournarockers are available in 9, 18, 35 and 50-ton sizes. Your nearest LeTourneau Distributor will be glad to give you all the facts on these highly mobile rear dumps. Call him, or write today.

Front-wheel-drive Tournarocker safely backs to edge of soft bank, dumps load into mined-out area. Body raises quickly at touch of dashboard electric switch.



Tournarocker-Trademark EX98

PEORIA, ILLINOIS

● LIFTING EQUIPMENT

MOVING YOUR DREDGE TO NEW GROUND? For Efficient Operation LET YUBA MOVE, REDESIGN AND REBUILD IT!

3 Case Histories Show the Possibilities

REBUILT 3 TIMES



Capital No. 2 (now Biggs No. 2), built in 1906 as YCGF No. 3, has been redesigned and rebuilt 3 times and used in three different areas. Bucket speed was increased from 18.6 to 22.8 feet per minute, bucket capacity increased from 7 to 9 cu. ft., digging depth changed from 60' to 61½' and later reduced to 50', then to 47'. Daily average running time upped from 18.317 to 22.1 hours.

2 DREDGES COMBINED



Biggs No. 1 operating at Rio Bonito, California, with 9 cu. ft. buckets and 50' digging depth, was assembled in 1935 from the machinery of YUBA No. 48 (erected in 1921 at Fairplay, Colorado) and the rebuilt hull of YCGF No. 4 (Hammonton, California, 1914).

DREDGE MOVED, DIGGING DEPTH CHANGED



Capital No. 3 was originally YUBA No. 39, built in 1916 with 18 cu. ft. buckets and 77' digging depth, for Hammonton, California. In 1930 it was redesigned, moved to Folsom, California and rebuilt as Capital No. 3 with 62½' digging depth.

Why guess? Let YUBA help you attain increased efficiency when you move to new ground, or when conditions change and redesign becomes necessary.

Our more than 40 years of bucket ladder dredge experience is available to you for moving, redesigning, and rebuilding old dredges, whether YUBA or not. YUBA's are used all over the world to capture gold, tin, platinum and other minerals, and for aggregate production. Write or wire us NOW. No obligation.



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Continued from Page 44

tributing technical assistance until Indian personnel is trained. Another plant also is to be set up to produce uranium and thorium compounds from the uranium ores and uranium and thorium-bearing residues obtained from the Alwaye plant. During the past year pilot-plant research has yielded a profit of Rupees 1,500,000 from thorium and cerium and monazite sands in the district.

INDIA—The century-old diamond mines of Panna in Madhya Pradesh are being reopened as a result of a promising survey by the Geological Survey of India. Machinery capable of handling 250 tons of ore per eight-hour shift has been installed and began operating last month. Two mining experts of the Anglo-American Mining Corporation are guiding research operations at the mines.

TURKEY—The new smelter of the Murgul Bakir Isletmesi (Murgul copper works), controlled by Etibank, Ankara, began operating March 25, blowing its first copper charge. Professor Otto Barth, metallurgical consulting engineer, The Royal Institute of Technology, Stockholm, Sweden, and his assistant, Sezay Cankut, metallurgical engineer, were on hand to supervise the beginning of operations, a result of many months of preparation and installation.

CHINA—A geological survey made in the iron ore region of Chiffo Island, Yantai City, Shantung Province, showed five formations of iron ore in Pre-Cambrian feldspar-quartz gneiss. The thickness of the middle formation runs from 18 to 22 meters with an iron content of 25 to 45 percent. The four other formations are one to six meters thick and average less than 25 percent Fe. Thus, within 200 meters vertical depth, the middle formation contains an estimated 25,600,000 tons of 33 percent Fe ore.

INDIA—The Indian Planning Commission is working on a five-year development plan to raise aluminum output and will soon present the plan to the Government for authorization. In general the plan advocates the expansion of the two principal existing units to 5,000 tons each, the construction of a new plant with a capacity of 15,000 tons yearly in the Hirakud area, and the possible construction of a large central alumina plant to prove a cheap supply of alumina for producers of virgin aluminum metal.

MALAYA—Pacific Tin Consolidated Corporation produced 3,098,831 pounds of metallic tin in 1950 compared with 2,180,088 pounds in 1949. Net income was \$668,672 against \$622,290 in 1949. At a recent meeting at New York, Albert E. Thiele, chairman, said the future of the company depended on the outcome of southeast Asian unrest; during the last year 125 special armed constables and five armored cars were on constant duty at the mines to protect employees from guerrilla raids.

INDIA—Officials have advised that contrary to reports circulating in the past few months no embargo exists on the export of manganese and mica from India. The export quota of high grade manganese ore fixed for 1951 is 800,000 tons. There is no restriction on the export of low grade manganese ore.

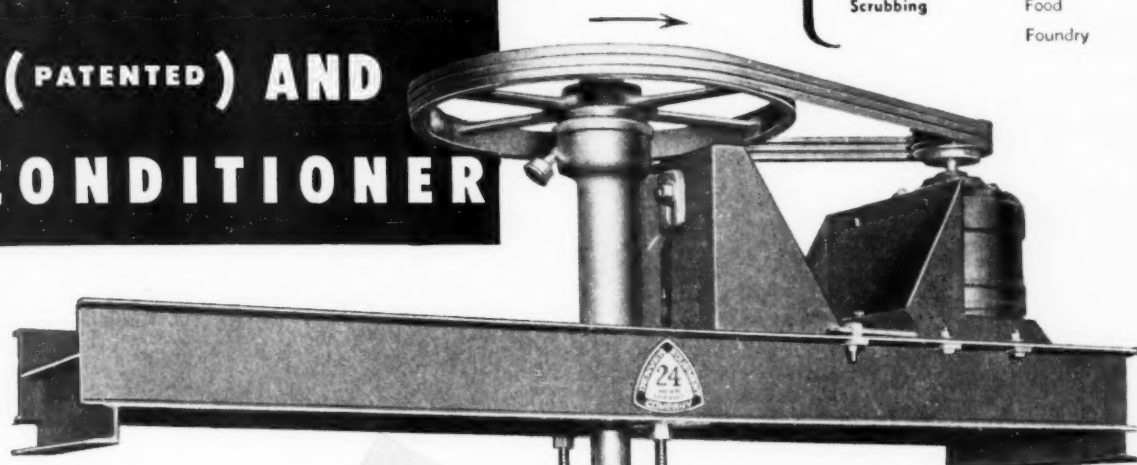
TURKEY—A production of about 60,000 metric tons of chrome ore and 80,000 tons of manganese ore is expected from mines

Continued on Page 53

DENVER SUPER-AGITATOR (PATENTED) AND CONDITIONER

FOR TOUGH
PROBLEMS IN

Agitating	Mining
Aerating	Milling
Mixing	Processing
Blending	Chemical
Conditioning	Industrial
Scrubbing	Food
	Foundry



EVERY PARTICLE MIXES

Feed normally enters directly into the standpipe top . . . is sucked down and is positively mixed by the propeller at the lower end. Thus, there can be **no** short circuiting of pulp as every particle is thoroughly agitated and mixed.

EVERY PARTICLE RECIRCULATES

Pulp movement in the tank is constantly toward the adjustable central standpipe due to the sucking and mixing action of the propeller and the resulting controlled vortex down the standpipe. Intermediate recirculation ports may be opened or closed depending on the treatment process.

FEED LOW...DISCHARGE HIGHER

A feed port is available directly to the lower end of the standpipe. Since discharge is at a higher point, an actual gain in elevation can be had for series applications.

NO SANDING UP

For intermittent operation or between shifts, there is no problem of "digging out" as the replaceable alloy iron standpipe flange prevents "sanding in" of the propeller.

SIZES 3' x 3' to 20' x 20'

Write for Deco Bulletin A2-B2; containing detailed information and pulp density charts for calculating size required.



FLOTATION ENGINEERS



WRITE TODAY FOR DETAILED INFORMATION

"The firm that makes its friends happier, healthier and wealthier"

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DENVER EQUIPMENT COMPANY, 1404 17th St., Denver 17, Colorado

There's a big



This "Cat" D8 Tractor with matching blade, owned by C. Ryan & Son, is working at the open-pit molybdenum mine near Climax, Colorado. This mine produces 4,000 tons per day of molybdenum which is sorely needed for the building of our military strength.

IF YOU WANT TO HELP YOUR COUNTRY— AND YOURSELF AT THE SAME TIME— READ EVERY WORD ON THESE TWO PAGES

Keeping equipment *on the job* is of prime importance today—to the nation as well as the mining industry. With the defense effort thrown into high gear, metals are more strategic than ever. Already the United States and Canada are responsible for almost \$3 billion of the world mining production (excluding coal), and an even greater effort is called for.

Right now there is a shortage of material with which to build urgently needed machines and parts. Military and Defense Rated Orders get the nod over unclassified civilian needs. Steel and other materials are in short supply. This means that you—with our help—must get every last machine-power hour out of the equipment and parts you now have.

Down-time will not only weaken the defense effort, it can mean costly delay for the mine operator too. Open-pit operations, for the critical ores, are under constant pressure for increased production. Naturally the machines that strip the ore deposits are working harder and longer.

It's a situation which makes it doubly important to "baby" equipment by giving it the best care possible.

So to stay in business profitably, and help America arm for defense, do these things now:

- 1** Use equipment properly. "Cat" machines are built for hard use—not abuse.
- 2** Give extra attention *now* to preventive maintenance (see next page).
- 3** Discuss your parts needs and maintenance problems with your "Caterpillar" dealer. His maintenance responsibility begins where your operators' and mechanics' responsibility ends. He has the skilled servicemen and equipment to rework and rebuild worn parts to keep your machines on the job longer.

CATERPILLAR TRACTOR CO., San Leandro, Calif.; Peoria, Ill.



The last war showed the Military that "Cat" Earthmoving Equipment was as important to defense and offense as tanks. Here Sgt. Robert Chrisman operates a "Cat" D7 Tractor with matching blade on Davison airstrip at Ft. Belvoir, Va.

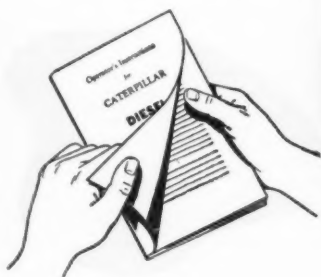
job ahead!

You're

the

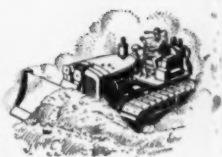
Doctor

Today no owner can afford to think of direct costs alone. Good care of equipment can mean the difference between a producing machine and one laid up for repairs. To see how good care can save many hours of equipment life, read your Operator's Instruction Book often and follow these suggestions.



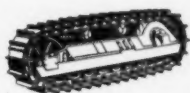
• DUST

Think of dust as Machine Enemy No. 1. A few grains today—a few more tomorrow—and soon the result adds up to serious wear. Dust or dirt plugged breathers or air cleaners—use of dirty oil containers—loose intake manifolds—loose inspection covers—dirty clutch compartment—failure to wash flywheel clutch compartment—worn seals on crankshaft—defective gaskets—failure to clean oil filter openings . . . these are some of the vulnerable spots.



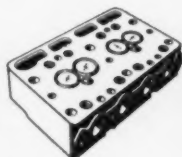
• TRACK ASSEMBLY

Don't let abusive use or neglect cripple the service life of your track assembly. Track adjustment and lubrication of rollers, carrier rollers and idlers are your job. Before excessive wear occurs on grousers, links, pins, bushings, idlers, rollers and sprockets, call in your "Caterpillar" dealer. He can build up grousers, rollers, idlers and links, and replace sprocket rims and turn pins and bushings so you will have many additional hours of service.



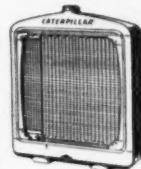
• CYLINDER HEADS

Prevent cracked cylinder heads by avoiding overheating, freezing, scale deposits, filling a hot engine with cold water, pulling heads down too tight, and other poor maintenance practices. Your "Caterpillar" dealer can repair most cracked cylinder heads. He can replace worn valve seats with valve inserts and restore the rocker arm mechanism to serviceable limits. Consult your Operator's Instruction Book for proper cooling system and valve care.



• COOLING

Don't let your engine overheat. Keep the cooling system free of scale, rust and sediment. Use soft or treated water, and when freezing temperatures exist, protect your engine with anti-freeze. Clean the radiator regularly with chemical flushing solutions. Remove foreign matter from the core by brushing or washing. Prevent engine troubles which come with overheating. Consult your Operator's Instruction Book for proper cooling system care.



• LUBRICATION

Careful lubrication practices will add much to your satisfaction through equipment performance, economy and long life. Use *only* recommended lubricants, changing the lubricant at proper intervals. And use *only* "Caterpillar"-proved filter elements. Remove dirt from fittings and clean around the crankcase filler cap before adding oil. A little care saves many hours of engine life. Consult the lubrication chart in your Operator's Instruction Book.



• PISTONS AND LINERS

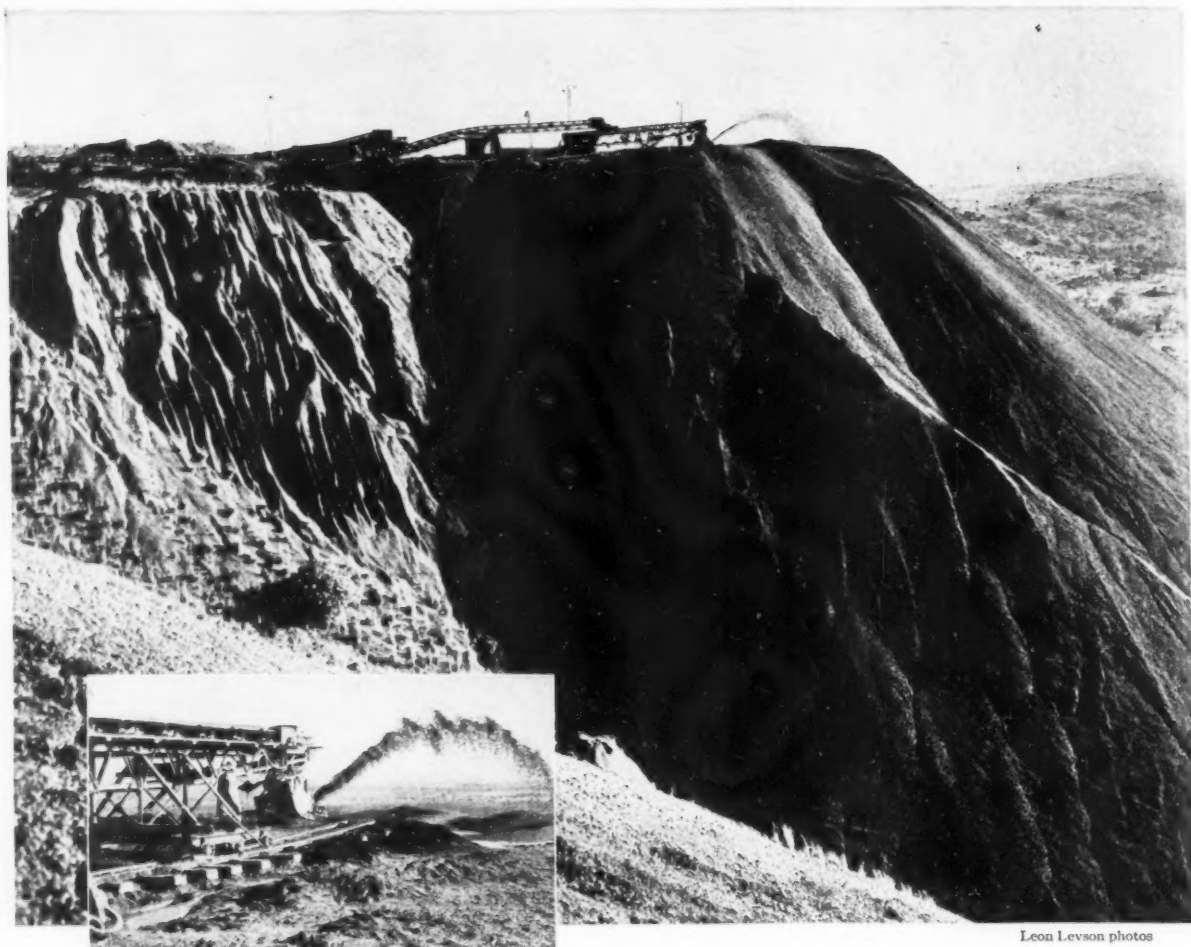
Almost all the piston wear occurs in the upper ring groove. Your "Caterpillar" dealer can renew your pistons by machining the upper ring groove for a wide ring, many sizes of which are chrome plated. Worn liners can be deglazed and put back to work for many additional hours of service life. Consult your Operator's Instruction Book for information on lubrication and the oil cooling system.



CATERPILLAR

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DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT



Leon Levson photos

Mountain Under Construction

—700 tons an hour—at lowest cost per ton

To recover a single pound of diamonds about 15,000,000 lbs. of earth must be moved. Disposal of tailings is in itself a huge job—and cost-per-ton becomes a prime factor in profitable operations. This was the condition S-A engineers and Fraser & Chalmers (SA) Ltd., met in designing the conveying system that “built” the mountain you see above.

S-A equipment and 50 years of S-A engineering experience, have combined to produce a handling system that has fulfilled every expectation by moving enormous quantities of material at very low cost per ton. The flexibility of the system enables it to be extended easily and economically as needed.

If you have a bulk materials handling problem, let an S-A engineer show you what S-A can do to provide a cost-reducing solution. Write for a survey. No cost or obligation.

PREMIER DIAMOND MINE

Cullinan, Transvaal,
Union of South Africa

An S-A Centrifugal Thrower Unit mounted at the end of a Shuttle Belt Conveyor throws tailings out over the dump pit in a trajectory of 50 to 60 feet. The thrower can handle approximately 700 tons per hour and can be swiveled to aim in any direction. As the dump face builds up, the conveyor system is easily extended. (In addition to tailings disposal, all other handling operations in the entire recovery plant have been mechanized with S-A equipment.)

50 years experience
STEPHENS-A-ADAMSON
MFG. CO.

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DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

INTERNATIONAL

Continued from Page 48

along the Black Sea and in the Kytahua, Izmir and Biledek districts worked by *Minotra A/S*, a Norwegian company, in cooperation with Turkish operators.

IRAN—About 27 miles from Isfahan lead deposits have been reported found, and along the Persian Gulf deposits of copper, lead, iron and asbestos also have been found.

INDIA—A pilot plant for the production of beryllium is being set up at Jamshedpur by the National Metallurgical Laboratory. According to recent reports, India has banned export of beryl and has announced rewards for the discovery of additional deposits.

INDIA—During 1951 the gypsum mines at Burbyar in Uri Tehsil, Kashmir State, will be worked. There is said to be a very large tonnage of available ore reserves in the area. Another mining project in the state will be the resumption of sapphire mining at the world-famous Paddar mines.



AFRICA

NIGERIA—From January 1, 1949, to March 31, 1950, 143 operators engaged in mining and prospecting in Nigeria, according to the Mines Department, and they comprised 27 public limited companies incorporated in the United Kingdom, 15 private limited companies incorporated in Nigeria, 6 firms operating under registered business names, and 95 private operators, mostly British. Royalties amounted to £611,350, of which tin contributed £521,000, columbite £10,000, and rents on mining leases £53,550. Exports in the period included 15,612 tons of cassiterite (tin ore) worth £6,816,788, 1,275 tons of columbite, and 3.50 tons of tantalite. There is great activity in the tin fields, and applications for mining land in the Plateau and Bauchi areas, the main sources of tin, have averaged 49

per month. *North Maroc, Ltd.*, has discovered a tin lode on the western scarp of the high Plateau, along a strike length of 600 feet and for a depth of 35 feet. *Amalgamated Tin Mines of Nigeria, Ltd.*, has sunk a prospect shaft into a granite hill, on top of which stringers of cassiterite have been worked, but without finding ore in depth. Producers hope for additional reserves from the deep-lead deposits under the basalt, and, west of Sabon-Gida, the Ngell shaft was sunk 182 feet deep to explore these deposits but has been hindered by water; as yet no mining has been done. Nigeria is the most important world producer of columbite and in the period under review 813 tons was shipped to the United States and the U.K. Most columbite is recovered as a by-product of tin.

SOUTH AFRICA-SOUTHERN RHODESIA—The *Messina (Transvaal) Development Company, Ltd.*, has deferred building a new converter for a time, having increased the capacity of the existing one, but plans to build a new refining furnace, to install a casting wheel to replace its hand-ladling system, to modernize the smelting plant, to add to the crushing plant, to build more employees' houses, and to sink the Arton Villa and Harper shafts deeper. In the past year the company has sunk the Grenfell shaft to a depth of 535 feet and has done about 6,300 feet of development on the 200 and 500-foot levels. Three different lodes are being developed and about 56,000 tons of ore has been exposed. At Harper a new generating set is being readied for operation, and when it begins, a sixth rod mill, now being erected, will be able to operate. The company has a new interest in a copper prospect, about 30 miles north of Sinoia in Southern Rhodesia, owned by *Rhodesia Copper Ventures, Ltd.*, inclined drill holes have indicated at least one large orebody.

ALGERIA—A mining commission is at Colomb Bechar, southwestern Algeria, studying the region for the possibility of establishing heavy industries as a result of the discovery of iron and copper ore deposits. The occurrences of both metals are at Bou-Kais near Colomb Bechar, and a railway links the latter with Oudjda.

SOUTH AFRICA—Gold output in the Transvaal for the month of March, 1951, amounted to 952,864 ounces compared to 886,057 ounces in February.

GOLD COAST—*Ariston Gold Mines (1929), Ltd.*, advised recently that to the year ended September 30, 1950, 293,000 tons of ore was treated, and gross revenue from bullion was £1,286,506, both figures records. Development results for the year and since then have been very good. Total ore reserves showed a net increase of 50,606 tons to 3,125,344 tons, averaging 6.66 dwts. over a width of 170 inches. For the first three months of this year tonnage milled has averaged 26,500 tons monthly.

NORTHERN RHODESIA—Output of cobalt alloy is rising and in the period from January through November, 1950, production was 1,612 tons, an increase of 363 tons over the same period in 1949.

SOUTH AFRICA—During 1950 *Brakpan Mines, Ltd.*, milled 1,401,000 tons of gold ore, an increase of 109,000 tons over 1949, and yield per ton was 3.78 dwts., slightly lower than in 1949. The company won the prize in Class I of the Prevention of Accidents Committee for producing mines of the Witwatersrand and Extensions. With over 7,000 workers, the accident rate for a three-year period was 0.989 per 1,000 underground employees, the best record of 13 mines in the class.

UGANDA—*Kilembe Copper, Ltd.*, has applied for a prospecting license on a further 26 square miles on which to carry on exploration because of favorable ore developments on territory it now holds. The company has acquired two more surface drills to use for the extra work. A five-ton-per-shift pilot mill, erected at the end of last year, is in operation to carry on tests for the beneficiation of copper and cobalt.

SOUTH AFRICA—In 1950, the *Premier (Transvaal) Diamond Mining Company* near Pretoria hoisted 2,483,047 loads of Kimberlite and 2,238 loads of waste. The loads washed were 2,459,826. The recovery was 690,330.5 metric carats, equivalent to 0.28 metric carat per load. The estimated value was £1,460,460 or 42 shil-

UNION MINIERE DU HAUT-KATANGA OPERATES LARGEST CONGO SMELTER

An aerial view of the Elizabethville copper smelter and slag dump of the Union Minière du Haut-Katanga, Elizabethville, Belgian Congo. The smelter smelts the copper sulphide concentrate from the Prince Leopold concentrator at the Kipushi mine. The smelter has a capacity of about 500-tons of copper concentrates per day. The concentrates from the Prince Leopold contain chalcocite and bornite and average about 24 percent copper. Expansion of operations and modernization of plants over the last several years has resulted in a large increase in copper, zinc and cobalt output by Union Minière.



INTERNATIONAL

lings, 4 pence per carat. Sales were 702,106.75 metric carats valued at £1,594,317.

TANGANYIKA—The new electric power plant installed at the Williamson diamond mine at Mwadui, Shinyanga, was officially opened recently by the Governor of the territory, Sir E. Twinning. Five units, each of 900 kw., of which two are already in operation, will comprise the complete installation. The new recovery plant with a rated capacity of 3,000 loads per day, is now being installed.

SOUTHERN RHODESIA—Vereeniging Brick & Tile Company, Ltd., of the Anglo American group, and another public company not of the same group, Consolidated Rand Brick, Pottery and Lime Co., Ltd., are jointly sponsoring the formation of a company, Rhodesian Refractories, Ltd., with an authorized capital of £400,000. The new company will process

magnesite and basic refractories and will take over six base metal claims at Ga-tooma, Southern Rhodesia. An early start is to be made with the erection of a plant.



NORTH AMERICA

CANADA—Canadian government assistance to marginal gold mines will total between \$10,000,000 and \$11,000,000 this year, considerably more than operators expected.

QUEBEC—Gaspé Copper Mines, subsidiary of Noranda Mines, Ltd., will be greatly benefited by the new 27-mile road which the province will build from

the mine in Holland Township to Mon St. Louis on the south shore of the Gulf of St. Lawrence. Also a hydroelectric power plant will be built by the province to supply the mine, the company, plants, and prospective customers in the area. Two obstacles are thus removed in Noranda's plan to bring the copper properties into production. A 5,000-ton concentrator is planned for the mine, and a smelter is being contemplated but details have not passed the initial stages. To exploit the copper deposits in the area will take an estimated \$30,000,000 over the next few years, according to Premier Duplessis, of which Noranda plans to spend about \$15,000,000. Tonnage outlined by drilling is said to be 57,000,000 tons at the Gaspé property.

BRITISH COLUMBIA—This province has been the scene of many new developments in the past eight or ten weeks, with the following companies appearing in the news: *Golden Contact Mines* has ordered a crusher of 200-ton daily capacity for its gold property at McGillivray Falls, according to Malcolm McGregor, president, and William Blair, manager. *Kaslo Base Metals* has bought a 50-ton mill for its *Index* mine in the Slocan district, E. S. Gourlay, president, says. *Kootenay Belle Gold Mines, Ltd.*, which has a 60 percent control of *Retalack Mines*, has optioned the adjoining *Ruth-Hope* and *Richmond-Eureka* mines. The company also operates the *White-water* mill and mine near Sandon, and leases its *Kootenay Belle* gold mine near Salmo. *Ainsworth Base Metals, Ltd.*, has been incorporated in B.C. to acquire title to and develop the *Black Fox* and *Ainsworth* groups of eight claims. Edward Thomas, Dr. William Rutledge, and H. E. Kenward are three of the directors. The new company, *Giant Mascot Mines, Ltd.*, formed by the merger of *Hedley Mascot Gold Mines, Ltd.*, and *Silver Giant Mines, Ltd.*, is now shipping concentrates, is milling 100 tons daily and is planning to increase this rate to at least 200 tons. *Kootenay Base Metals, Ltd.*, has ordered a 60-ton concentrator for its lead-zinc-silver mine near Estella, formerly run by *Mining Corporation of Canada*. L. G. White is manager. The company plans an aggressive development campaign this year. The *Western Uranium Cobalt Mines* is reopening the *Red Rose* tungsten mine near Hazelton. The property ceased operation after the last war. A mill with 75 tons daily capacity is planned. *Western Uranium* is building a mill also on the *Rocher de Boule* property three miles away. The *Atlin-Ruffner* lead-zinc-silver mine will be reopened this year, according to Frank L. Smith, resident manager. Stripping of one orebody by bulldozer is scheduled in June, and underground equipment is being acquired. *Sheep Creek Gold Mines, Ltd.*, has completed negotiations to acquire the *Mineral King* mine for \$30,000. The property is in the Windermere district. Two diamond drill holes have revealed good showings of lead-zinc ore. Frank N. Marr, Spokane director, said. One 70-foot-wide surface orebody has been found. The company owns or has an interest in four other operating mines. *Convett Exploration Company, Ltd.*, advises the discovery of important surface showings of asbestos on optioned claims

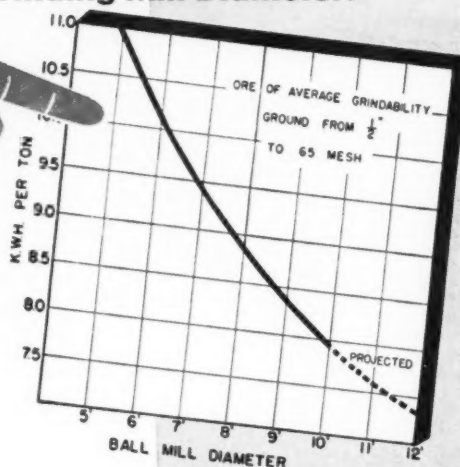
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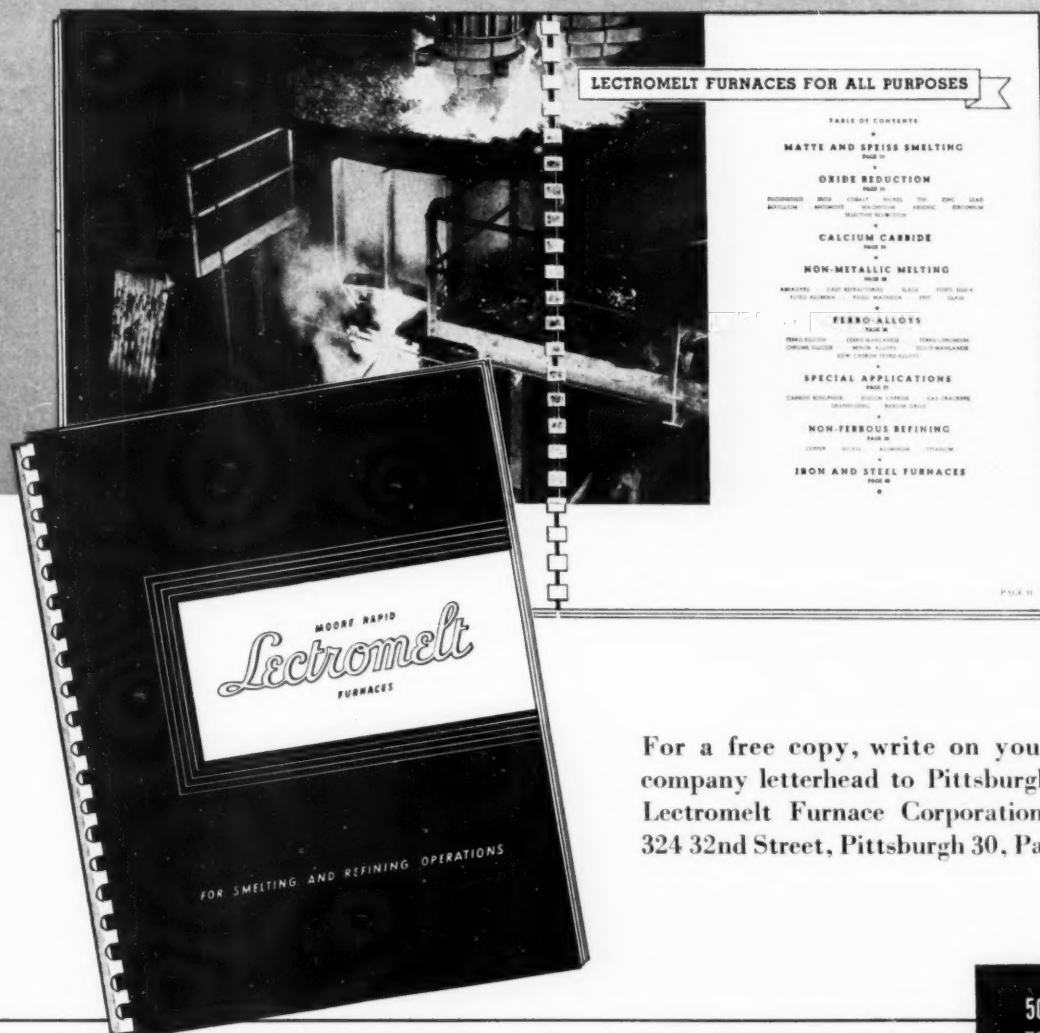
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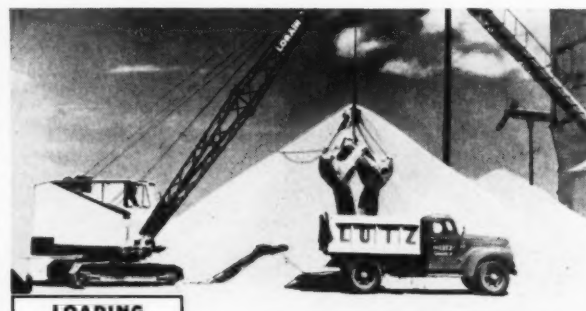
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INTERNATIONAL

on McDame Mountain in northern B.C. Diamond drilling is planned and prospects for production are said to be good. **Day Mines, Inc.**, of Idaho, has formed **Diem Mines, Ltd.**, to explore properties recently acquired in Canada.

YUKON TERRITORY—**United Keno Hill Mines** plans to install a 350-ton-capacity cyanide plant to treat oxidized ores which the present mill cannot handle properly. The cost will be about \$550,000. The company operates in the Mayo district and plans to open four new levels in its **Hector** mine, the main producer, during 1951 by sinking a winze from the 400 level.

MANITOBA—**Northern Chemicals, Ltd.**, a subsidiary of the **Lithium Corporation of America**, which produces spodumene ore (lithium) in South Dakota, is installing machinery, building a road and camp houses in order to start producing lithium from its **Cat Lake** property, 80 miles northeast of Winnipeg.

ONTARIO—**Silanco Mining and Refining Company** will reopen its **Aquanico** mine in the Cobalt region and will double mill capacity to 200 tons daily. The mine has produced over 7,000,000 pounds of cobalt in the past. Further exploration to open new orebodies will be done.

SASKATCHEWAN—An initial production rate of 500 tons of uranium ore daily is planned by the **Eldorado Mining and Refining, Ltd.**, for the **Ace** mine at **Beaverlodge Lake**.

ALASKA—The National Production Authority has granted approval to the **Goodnews Bay Mining Company** to build a community building at **Platinum**. Cost of the structure is \$7,100.

QUEBEC—At **Noranda**, **Noranda Mines, Limited**, plans to install a 300-ton per day sulphur-iron plant at the **Horne** mine to treat pyrite concentrate by a process designed to produce sintered iron-oxide, elemental sulphur and sulphur-dioxide gas from pyrite. About 30 percent of the sulphur can be converted into elemental sulphur and the remainder comes off as sulphur-dioxide gas. If the process works out on a commercial scale other plants may result. Ore reserves at the **Horne** recently were reported to total 17,547,900 tons, including sulphide-copper ore, and silicious fluxing ore.

ALASKA—The **United States Tin Corporation** reportedly has received a loan from the government for \$375,000 to further its tin mining and processing in Alaska. The company mines in the **Lost River** area. **Harry Fischmaller** of **Seattle, Washington**, is president.

MINNESOTA—Surface stripping is currently underway at the **Morton** mine, operated by **The M. A. Hanna Company**, agents, at **Hibbing**. One 7½ cubic-yard-capacity shovel and ten 34-ton-capacity, end-dump trucks are being used on this job. The stripping consists of removing the top 20 feet of overburden in order to provide a level site for operation of the 1150-B dragline and conveyor belt system. The 1150-B dragline has finished casting a drainage ditch and pump sump along the north and west sides of the **Morton** pit and has resumed loading dirt in conjunction with the conveyor belt system.

BRITISH COLUMBIA—**Reeves MacDonald Mines, Limited**, reported from **Vancouver** that operating costs for the

year ended December 31, 1950, were \$4.942 per ton, total. The company milled 213,376 tons of ore, and shipped 19,542 tons of concentrates to the **Trail** smelter. Metal content was 16,617 ounces of silver, 3,820,884 pounds of lead, 17,303,286 pounds of zinc, and 106,183 pounds of cadmium. Ore is being produced from a surface pit as well as from 12 levels underground; four new levels are being prepared for production.

ARIZONA—During the three months ended March 31, 1951, **Magma Copper Company** produced 10,541,366 pounds of copper and 3,177 tons of zinc concentrates at its **Superior, Arizona**, mines. Net profit amounted to \$470,980.43.

IDAHO—**Bunker Hill & Sullivan Mining and Concentrating Company's** 63rd annual report covering the year ended December 31, 1950, shows the best results in the past 21 years. As of December 31, mine ore reserves totaled 3,014,476 tons. During the year the **Kellogg** mine yielded 34,043 tons of lead, 8,676 tons of zinc and 2,701,927 ounces of silver. (In 1949 the figures were 21,770, 5,282 and 1,584,383.) Reworking of old tailing added 3,677 tons of lead, 1,352 tons of zinc and 189,271 ounces of silver in addition. Ore mined in 1950 totaled 395,813 tons against 253,068 tons in 1949. Not included in those figures is ore produced from block-caving operations which produced 112,445 tons of ore compared with 45,937 in 1949. Value of ore recovered was \$13,627,184 against \$9,361,696 in 1949.

TEXAS—In the fiscal year ended May 31, 1951, **Dow Chemical Company** spent

about \$65,000,000 on plant expansion and expects to spend more than that in the coming fiscal year. In the past nine or ten months **Dow** has doubled output of magnesium metal; the plant at **Freeport** is operating at a rate of 25,000 tons yearly. Output from the government plant **Dow** is reactivating at **Velasco** will be about 40,000 tons of magnesium next year. **Leland I. Doan**, president, made the announcements.

NORTHWEST TERRITORIES—According to **J. McAvoy**, president, the **Joe Indian Mountain Metal Mines, Ltd.**, has been formed, with a capitalization of 5,000,000 shares, to bring into production a group of 33 zinc-silver-lead-copper claims at the most easterly arm of **Great Slave Lake** in the **Yellowknife** district. The company has a crew at work now to rehabilitate camps and prepare for a program of 25,000 feet of drilling. To date 15,825 feet of drilling has been done. If 1,000,000 tons of ore can be proved, the company will be in a position to consider installing a mill.

ONTARIO—Current nepheline syenite production of between 7,500 to 8,000 tons monthly by the **American Nepheline, Ltd.**, a subsidiary of **Ventures, Ltd.**, will be raised to 10,000 tons monthly by July. Extensions to the mill building will be made for a new rotary dryer and new ore separators. New drills, of the **Keystone** type, have been purchased and are expected to be more economical and productive than present drills. The ore is quarried on the top of **Blue Mountain**, 35 miles north of **Peterborough**.

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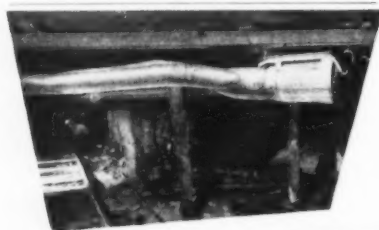
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ALABAMA—Two Alabama mining companies recently acquired new mills. The Shook & Fletcher Supply Company is installing an HMS plant at its Warner brown iron mine near Russellville. Capacity of the plant is about 70 tons of 3 by 1/2 inch iron ore per hour. The Alabama By-Products Company at Praco has installed a Mobil-Mill for coal washing. Initial rate of treatment in the washer is 40 to 50 tons of jig middling per hour.

ONTARIO—The Nemegos Uranium Corporation of Buffalo, New York, reportedly has announced the discovery of an estimated 10,000,000 tons of fairly high grade iron ore in northern Ontario. The ore also contained calcium phosphate, titanium, and uranium and was discovered when the company officials were searching for uranium deposits. Officials include Walter W. Grupp, president, and Hamlin B. Hatch, consulting geologist of Toronto, who is managing director of the company.

QUEBEC—The Gaspe property of the Federal Zinc and Lead Company in Lemieux County, Gaspe North, is being jointly developed underground by East Sullivan Mines and Sullivan Consolidated Mines, according to Maurice Scott, consulting geologist. The two Sullivan companies acquired an option on the 7,000-acre property last fall and since then have done 8,000 feet of drilling. Now an adit, 1,500 feet long, has been started in the Brandy Brook section of the mine for the purpose of opening five different veins, indicated by drilling. Two other areas of the property, the original Federal area, where a shaft exists, and the Berry Mountain Brook area, also have shown encouraging diamond-drill results and will probably be investigated in detail later on.

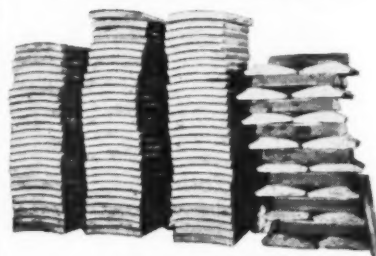
CALIFORNIA—According to George Herrington, chairman, Idaho-Maryland Mines Corporation has doubled gold recovery in the last five months at its Grass Valley property. A crosscut is being driven on the 2,700 level to cut the downward extension of the vein now being mined above. The company expects it may be able to derive some revenue in the near future from scheelite as a by-product from gold production. Idaho-Maryland's working force now numbers 200 and 60 more men are leasing.

MARYLAND—The Baltimore and Ohio Railroad announced recently that its new \$5,000,000 ore pier had been completed with unloading facilities capable of handling 1,500 tons of ore per hour. The chief source of iron ore imported at the Baltimore port comes from Chile, which shipped 2,569,980 tons in 1950. Other major sources of iron ore arriving at the port are Sweden, Brazil, Algeria, British West Africa, Cuba, and Iran.

SASKATCHEWAN—Nisto Mines, Ltd., has not had the encouraging results hoped for in its drifting program on uranium occurrences in the Black Lake area but is by no means finished with exploration. Drifts off two adits opened seven mineralized sections; three more sections will be investigated, two through driving a third adit. The seven sections, totalling 314 feet, averaged a reported \$15.00 in uranium oxide based on the \$7.25 price per pound.

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INTERNATIONAL

BRITISH COLUMBIA—Ottawa Silver Mining and Milling Company's mine near Slocan City is being developed and mined by New Ottawa Mining Company which acquired an interest in the former several months ago. Due first to low silver prices and later to lack of operating capital, the mine has been fairly inactive for a decade or so. New Ottawa, headed by George MacMillan of Violamac Mines and Patrick Harrison, drilling contractor, has nine men at work at the property. A raise is being driven in ore from the 800 to the 500 level and so far about 15 tons of shipping ore, estimated to contain from 20 to 150 ounces of silver per ton, have been mined. Some diamond drilling is planned.



BOLIVIA—Patino Mines and Enterprises Consolidated, operating at Catavi, has announced the proposed expenditure of \$20,000,000 during the next 10 years in

development of Bolivian mineral and agricultural wealth. The company plans to invest \$1,000,000 during 1951 in its own properties, and probably beginning in 1952 will invest \$2,000,000 yearly for 10 years in an investment corporation, the capital of which will also be added to by other mining concerns, and probably agricultural concerns. Patino will soon start installation of a new plant to recover low grade tin concentrate from tailings on its properties and also plans creation of an exploration department with eight full-time geologists.

MEXICO—The Mexican Gulf Sulphur Company reportedly has received a credit from the Export-Import Bank for \$1,875,000 to bring the sulphur deposits in the Isthmus of Tehuantepec into production at a rate of 15,000 tons monthly. In Mexico City, the Chamber of the Mining Industry advised that about \$2,300,000 worth of equipment will be set up immediately. Whether or not the bank's funds were part of the latter figure was not explained. The Chamber also stated that the Mexican Government plans to invest about \$750,000 in a sulphur dome at Jaltipan, State of Vera Cruz, and that more U.S. credits would be made available for development of sulphur deposits near Mexicali and the port of San Fe-

lipe on the Gulf of California coast. Production would be about 2,000 metric tons of ore daily. A Salt Lake City, Utah, U.S.A., firm was said to hold these options.

CHILE—The Chilean nitrate industry expects to produce about 1,900,000 metric tons of nitrate in 1951, about 18 percent more than the 1950 output. The increase is a result of expansion by several companies. The Lautaro and Anglo-Chilean Nitrate companies expect to complete their merger by July and are working to finish erection of a solar evaporation system. The Cia. Salitrera de Tarapaca y Antofagasta plans to expand its Victoria plant at a cost of about \$3,000,000, doubling the present capacity of its facilities. Output will then be about 24,000 tons a month.

BRAZIL—The aluminum plant at the town of Aluminum, 45 miles from Sao Paulo, will be producing an average of 600 tons monthly in the near future. Ore for the plant comes from Pocos de Caldas, State of Minas Gerais.

MEXICO—At Durango, Cia. Minera Santa Maria del Oro, S. A., subsidiary of the International Mining Corporation, New York, milled 138,429 dry metric tons of gold-copper ore during 1950 for a recovery before depreciation payments of \$201,924.36. The company continued development of areas outside those being mined.

BOLIVIA—Tin exports in ore and concentrates in February amounted to 2,744 metric tons, including 25 tons of pig tin from the Oruro smelter.

PERU—The Cia. Minera Atacocha, which operates in the Cerro de Pasco district, is completing installation of a new central hydroelectric plant, with a capacity of 4,500 KVA, in Charpin. The company also has finished installation of a new Hardinge ball mill with a capacity of 500 tons a day. The company is one of the progressive lead-zinc producers in Peru.

MEXICO—These mining companies have been organized and registered in Mexico, D.F., in the past several months: Vanadium y Metales Asociados, S.A., by Aldo Cicognani and Gausto R. Miranda; Cia. Minera Dique, S.A., by Julio Riquelme and Manuel Garcia G.; Minera La Paz, S.A., by Eduardo Prieto L. and Erasmo Lozano; Cias. Mineras La Morena y Anexas, S.A. de C.V. (to work La Morena mining tracts at Hustusco, Guerrero), by Rodolfo Sanchez and Angel Santiago; and Cia. Minera La Sopresa, S.A., by Eleazar Diaz and Aurelio Gonzales.

CHILE—Bethlehem Chile Iron Mines Company is preparing the Romeral mine for production. The Romeral contains magnetite ore such as that mined at the company's Tofo mine. Bethlehem is building a new harbor at Guayacan and railroad facilities from mine to port.

MEXICO—The Guanajuato government has agreed to help small companies exploit important tungsten, molybdenum, tin and zinc deposits discovered in Xichu, Victoria, Santa Caterina and Guanajuato municipalities by "gambusinos." The finds were verified by Ings. Luis Garcia Guiterrez and Ruben Porras, mining engineers assigned by the National Geo-

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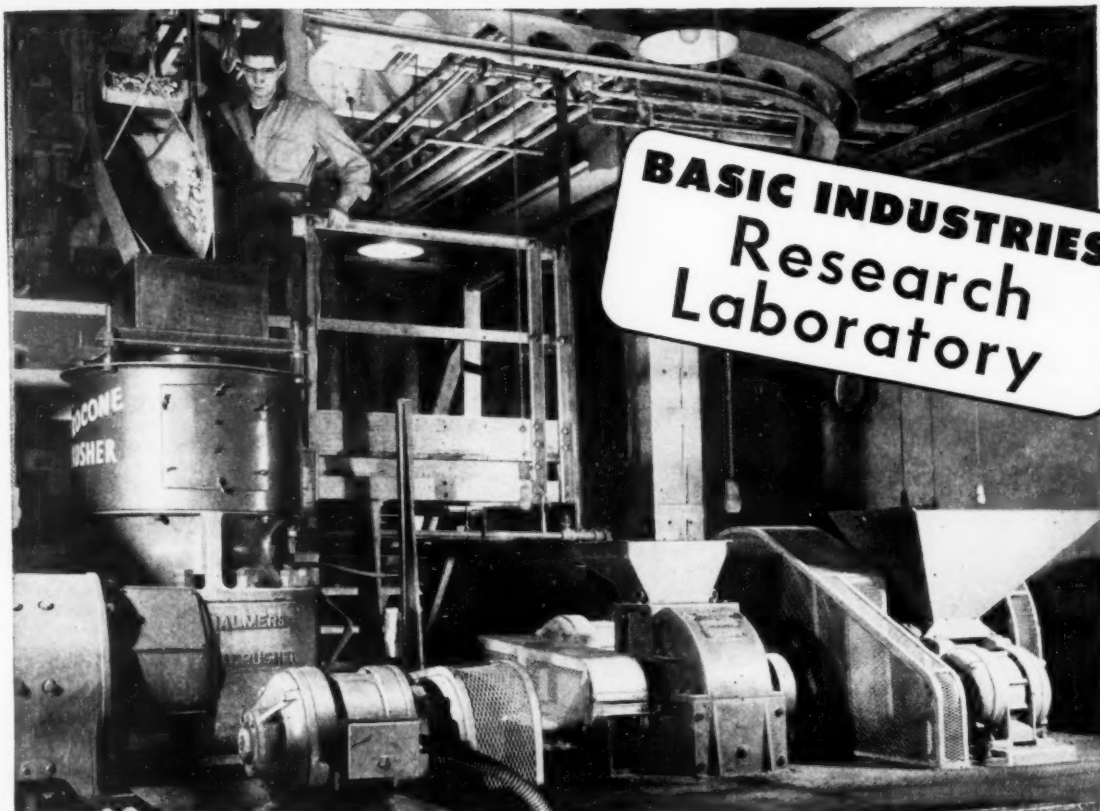
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INTERNATIONAL

logical Institute at the state government's request.

PERU—The *Cia. Aurifera Buldibuy* is constructing, for the government, a highway to join the Patate region with Chacabambilla in the Rio Marañon, where it will join the highway to Trujillo. This should be good news to mine operators.

MEXICO—Andrés Zertuche has given his mining property, *El Carmen*, Canon del Diente, Nuevo Leon, to the workers to operate cooperatively, paying him a royalty, the federal board of conciliation and arbitration has announced. The board denied published reports that the miners had seized the property because Zertuche had failed to pay wages long in arrears.



PHILIPPINES—Two or three more mining companies in the process of rehabilitating their properties should begin production this year. *Coco Grove, Inc.*, which was a successful placer operation prior to the war, is reconstructing its dredge. *Itogon Mining Company* has spent \$1,616,289 since the war in construc-

Nonmetallic Mineral Production in the Philippine Islands for the Years 1949 and 1950

Product	1949		1950	
	Amount	Value** Pesos	Amount	Value** Pesos
Coal***	123,336	2,679,119	158,822	3,420,057
Rock asphalt***	45,200	965,700	52,817	1,056,339
Gypsum****	2,710	113,541	2,883	110,311
Cement****	1,204,692	6,223,570	1,749,637	11,652,333
Total		9,981,930		16,239,121

*Estimated by the Philippine Bureau of Mines

**Official exchange rate two Pesos equals \$1.00

***Metric tons

****Barrels

tion and rehabilitation, and when the mill currently being erected begins operation, the property will be on a 10,000-ton monthly basis.

NEW SOUTH WALES—*Zircon Rutile, Ltd.*, at Byron Bay is now augmenting its supply of sands for its concentrator by operating a small suction dredge in the adjacent dunes.

WESTERN AUSTRALIA—*Lake View and Star, Ltd.*, for the year 1950 reports a revenue from mining and retreatment operations of about £A1,508,000 an increase of £A344,515 over the previous year. The higher price for bullion resulting from devaluation of sterling was the main reason for the increase. Expenditures including development, during the year increased by £A105,246.

TASMANIA—A leading Australian geologist reportedly has requested permission to re-examine the mines, plans and records of the old workings of the *Renison Associated Tin Mines N. L.* and *Pine Hill Tin Mines*. He is considering obtaining new capital to reopen these mines.

INDONESIA—Bauxite exports from Bintang Island to Japan during the first half of 1951 will be an estimated 100,000 tons. Bauxite exists in greater quantities on Bintang than some of the other islands; however, the best quality is mined from nearby Kojang Island.

PHILIPPINES—Completion of the development program now in effect by *Masara Consolidated Mines Corporation*, an interest of the *International Mining Corporation*, New York, is expected in July. At that time a decision will be made on whether or not to install a mill. Lack of equipment and interruptions in supply deliveries because of very wet weather has held back progress.

WESTERN AUSTRALIA—At *Protheroe* lead mine at Northampton, the *Anglo Westralian Mining Pty., Ltd.*, the new owner, has already blocked out three year's supply of ore, and drilling has indicated considerable future ore. The monthly output has been increased to 500 tons of concentrates from 1,650 tons of ore.

QUEENSLAND—Because of the current high prices, interest has revived in many of the old wolframite fields particularly in the Mount Garnet area.

VICTORIA—*Cocks Eldorado Gold Dredging N.L.* reports the completion of its boring program which has disclosed a large area of profitable ground downstream. At least five years dredging is assured on current gold and tin prices.

WESTERN AUSTRALIA—H. J. C. Connolly, consulting geologist to *Norseman Gold Mines N.L.*, has recommended a drilling program to investigate the gold prospects of the company's leases. His opinion is that the company's pyrite deposits are very extensive and valuable. Directors of the company believe that the pyrite industry will experience further expansion because of the world sulphur shortage.

NEW SOUTH WALES—*Point Lookout Antimony Mines Pty., Ltd.*, reports that diamond drilling has indicated a substantial tonnage of ore. The drilling program will be completed before the mill, which was damaged in recent heavy rains, is re-erected on a new site.

WESTERN AUSTRALIA—*Anglo-Westralian Mining Pty., Ltd.*, Big Bell, intends to carry out a development program at the *Ragged Hills* lead mine at



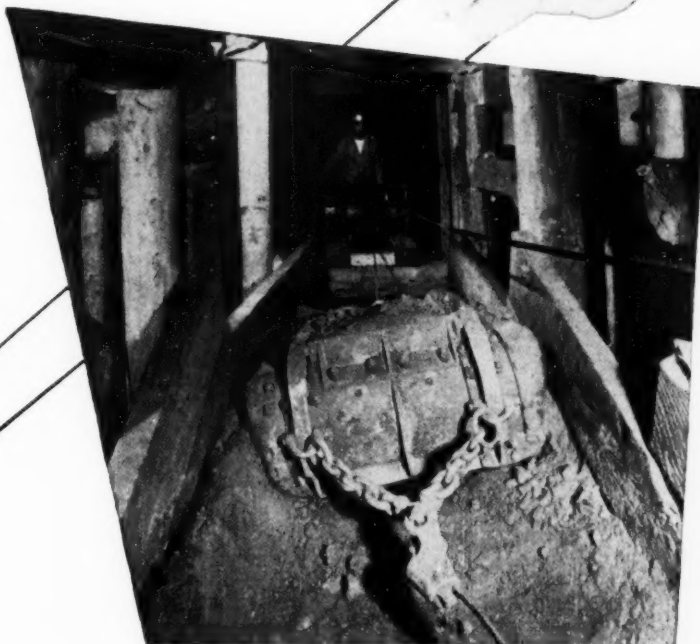
MT. MORGAN TO EXTEND OPENPIT MINE

About 1,900,000 long tons of sulphide ore will be mined by Mt. Morgan Ltd. beyond the present limits of its openpit copper-gold mine in Queensland, Australia. Also, during the course of overburden removal, some copper ore probably will be recovered. (The overburden-to-ore ratio is 1.37 to 1.0). The orebody was originally mined by underground methods but openpit mining has been used since a fire in 1925 devastated underground workings, some of which can, however, be seen on the pit's side. Seven benches have been developed in the pit. The recent addition of new and larger trucks has increased efficiency, and one of them is shown on the bottom level approaching a timber-covered, truck-weighing scale. Ore is concentrated in two flotation mills and concentrates reduced to blister copper in Great Falls-type converters; blister copper is refined at Port Kembla, the Queensland refinery of the *Electrolytic Refining and Smelting Company of Australia, Pty., Ltd.* For the year ended June 30, 1950, Mount Morgan recovered 80,947 ounces of gold and 4,260 tons of copper.

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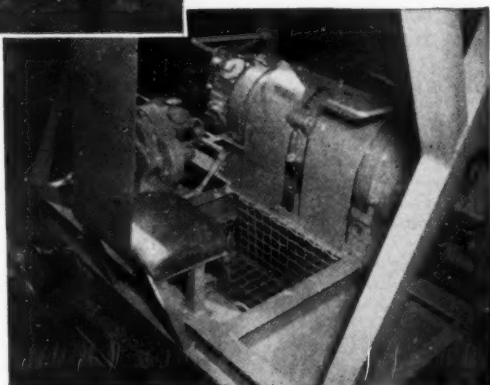
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INTERNATIONAL

Marble Bar. An extensive drilling program has been commenced to the south of the Golden Mile, by the *Kalgoorlie Southern Goldmines N.L.*



EUROPE

WESTERN GERMANY—The ancient lead-zinc mining district of Bensberg is to be re-explored and developed on a large scale by *AG des Altenbergs*, subsidiary of the Belgian concern, *Vieille Montagne*. Two new shafts are to be sunk in the near future.

EASTERN GERMANY—The target of the present Five Year plan of the East German Republic is to raise production from the 1950 output as follows:

Commodity	1950	1955
Mansfeld copper ore	840,000	1,500,000
Lead concentrates	1,080	9,500
Zinc concentrates		450
Iron ore	300,000	1,800,000

PORTUGAL—Ferro-tungsten production by the *Mines da Borralha* has been started. The company formerly purchased the ore from the French company, *Société d'Electro-Chimie d'Ugine*,

but those contracts have been ended. Output of wolframite in 1950 by Portugal was 312 tons, but this production, unfortunately, is expected to fall during 1951.

NORWAY—The uranium reactor at Kjeller near Oslo is expected to be ready for operation almost immediately. The reactor, which is costing £750,000, will be the sixth in the world. About 50 men will be employed when operations begin. The reactor will contain six tons of heavy water, costing almost £500,000, three tons of uranium and 45 tons of graphite. The Norsk Hydrochemical firm at Rjukan provided the heavy water. Uranium is produced at Evje.

NORWAY—An agreement reportedly has been reached between the Norwegian Government and the Economic Cooperation Administration of the U.S.A. on the main principles for financing the long-discussed aluminum plant at Sundalsöra, Western Norway, with a capacity of 40,000 to 50,000 tons yearly.

WESTERN GERMANY—Additional coal allocations and a greater supply of electric power have enabled the *United Aluminum Works* at Luenen to increase monthly production from 800 to 1,500 tons, according to Dr. Lorenz, manager. West Germany is producing about 6,000 tons of aluminum a month and needs from 7,000 to 9,000 tons.

SPAIN—Pyrite production will rise in 1951. The *Rio Tinto Company, Ltd.*, expects to produce 850,000 tons compared with 765,665 tons in 1950. The *Tharsis*

Sulphur and Copper Company, Ltd. expects an output of 800,000 tons from its mines in the Sierra Bullones and in the Larza mountains. A French pyrite company estimates its potential output at 55,000 tons this year. Various old mines are to be reactivated, such as the *Hererías*, *Cueva de la Mora*, and *La Joya* mines, all in the Huelva mining district. A new corporation is to be formed to mine Huelva pyrites and will construct a plant on the Mediterranean coast with a capacity of about 150,000 tons. Total pyrite production in 1951 will probably exceed 2,000,000 tons.

FINLAND—The state-owned *Outo-kumpu OY* mining company will extend its activities by resuming mining at the *Nivala* nickel-copper mine, by opening the *Aijala* zinc mine, and by starting production of iron from the copper slag of the *Harjavalta* copper works by a new method. To finance the program the share capital of the company has been increased from 245,925,000 Finnish marks to 1,315,888,000 marks. The *Nivala* nickel-copper mine was opened in 1941, but in 1947, when the world nickel prices fell, the mine closed. Prices now justify reopening. Zinc ore production at *Aijala* will be started within a year and will amount to 60,000 to 70,000 tons of ore per year, from which 2,500 tons of zinc concentrate and 10,000 tons of iron pyrite will be recovered.

RUSSIA—The *Kounrad* and *Balkash* copper mines along the northern shore of Lake Balkash (Kazakhstan) reported-

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13 ISSUES

INTERNATIONAL

are in danger of becoming completely inundated over a period of years because of the steadily rising water in the lake. The Balkash deposits are said to have produced nearly 60 percent of Russia's copper during the war.

NORWAY—The Norwegian Parliament decided in April to set up a state mining company, *A/S Statens Bergverk*, to take over shares and rights in various mining concerns already owned by the Norwegian government.

ROUMANIA—Asbestos mines have been placed in operation in the Pretosanjan area, producing at a rate of 650 tons monthly. Asbestos is found at a depth of 500 meters. According to Eastern German geologists who have been engaged by the Roumanian Government to manage the mines, the output could be raised to 2,000 tons monthly if the mines were properly equipped. The Russian Asbestos Syndicate has informed the Roumanian Government that it is prepared to send the appropriate equipment to the mines. But, the offer has been rejected. The creation of the Russian Mining Center in Budapest may, however, mean that control of the mines will be assumed, regardless.

HOLLAND—About 250,000 guilders will be spent by the *Zincwhite Company* to enlarge the capacity of its sulphuric acid plant at Maastricht (Limburg).

SWEDEN—In 1951 the Swedish exports of iron ore are estimated to be as much as 14,000,000 tons or eight to 10 percent more than in 1949. As of April, the iron mines had sold their entire anticipated production for the year.

FINLAND—Zinc deposits have been found at Vihanti in the west-central part of Finland and at Kisko in the southwest. Diamond drilling of the former deposit has resulted in estimates of about 700,000 tons of ore with an average metal content of about 6.0 percent, and of the latter deposit 600,000 tons of ore with a zinc content of about 4.7 percent. Finland has produced very small quantities of zinc in the past.

NORWAY—The new ore-loading quay of *Luossavaara-Kirunaavaara AB*, the Swedish iron mines, at the Norwegian port of Narvik, has been completed. Loading capacity on each side of the quay is 2,000 tons of ore hourly. The railway from the Lapland minefields to Narvik moves about 80 percent of all iron ore from that region to the Narvik docks, a total at present of more than 30,000 tons daily in 18 trains. Western Germany and Belgium each are importing about 300,000 tons of that ore monthly.

ITALY—A new law to be submitted by the Ministry of Industry and Commerce to the Italian Parliament may limit research permits to three years, with an option to renew for three more years in certain limited cases. If exploitation has

not begun after three to six years, research permits will expire.

SCOTLAND—The British Government hopes to develop a silver mine at an unnamed site in Scotland. A private company has been engaged to do exploratory work.

ITALY—The *Società Italiana dell'Aluminio* has been incorporated into the *Montecatini Società Generale per l'Industria Chimica e Mineraria* of Milan, which now controls 50 percent of the Italian aluminum industry. To increase further the supplies of bauxite for the industry, the Italian Government has ordered the investigation of bauxite occurrences recently discovered in the Gallipoli zone, southern Italy.

SWEDEN—A new company, *AB Saladolomit*, will exploit a dolomite deposit at Sala, northern Sweden. The *Svenska Elfabriksaktiebolaget* will resume mining activities at the *Förola* mines, north of *Nyköping*, central Sweden, after a shut-down since the 1930's. The *Forshammar* mining works has acquired an estate in *Skallerud*, Dalecarlia, central Sweden, and will exploit quartzite deposits there.

ENGLAND—A number of abandoned lead mines in North Wales have been re-examined recently and one property carrying lead, zinc and some gold is to be reopened in the *Mawddoch* valley, near *Dolgelly*. Other mines in the area already reopened are the *Trecastell* mine in the *Conway* valley, the *Carnarvonshire* and the *Parc* mine at *Llabrwrst*, *Denbighshire*.

SPAIN—Construction of large plants has been started by the *Magnesitas Españolas Ramón Quijano y Compañía* at *El Escorial*, near *Madrid*, for the production of raw, dead-burned, and caustic magnesite for export. The company owns large magnesite deposits containing only small quantities of lime.

ENGLAND—The Engineering, Marine and Welding Exhibition will be held in London from August 30 to September 13 this year, displaying engineering manufactures from all over the world. The chief sponsor of the Exhibition is the *British Engineers' Association*, 32 Victoria Street, London, S.W.1. from which further information can be obtained.

PORTUGAL—A plant will be built for the production of steel tubing by the *A. J. Oliveira Filhos and Company Ltd.* at *S. Joao da Madeira*, 190 miles from *Lisbon*, near an existing foundry and factory building owned by the firm. Present plans call for a total capacity of about 15,000 to 16,000 tons annually, with an initial production of 8,000 tons annually. This output should meet the needs of both Portugal and its possessions. The Economic Cooperation Administration will finance 74 percent of the total cost, which is estimated at \$1,340,000.

Ore Production in Tons in Yugoslavia, Roumania, Hungary and Bulgaria in 1949 and 1950

Ores of	Yugoslavia		Roumania		Hungary		Bulgaria	
	1949	1950	1949	1950	1949	1950	1949	1950
Iron	956,000	1,250,000	312,000	380,000	375,000	450,000	72,000	80,000
Chrome	123,247	152,115	1,110	1,560	.....	.....	535	870
Copper	718,356	890,000	789	778	.....	.....	415	345
Lead	818,000	923,115	59	105	.....	.....	93	67
Zinc	1,125,355	1,217,355	45	25	132	117	82	89
Bauxite	458,833	526,000	598,234	615,115

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QUICK METALLURGICAL CALCULATIONS

In answer to many requests from metallurgists and mill men, T. W. Molthen, mining and metallurgical engineer and assayer at the Summit King Mines, Limited, Fallon, Nevada, has permitted publication of his methods for figuring percent solids; volume and weight ratio in a mill pulp and the solids, by parts, in the overflow water from a tailing pond.

The examples used were all proved by actual laboratory tests. In all equations the specific gravity of water used is considered as 1.0.

The first equation is derived when the density pulp-can is filled to the mark with mill pulp of an unknown amount of water and ore.

Mill Pulp Calculations:

Letting X equal the amount of water and Y equal the amount of ore, then it is plain to see that equation (1) would be X cc. water plus Y cc. of ore equal 1,000 cc. Or to condense the equation it would be X cc. plus Y cc. equal 1,000 equal equation (1).

The can with its contents are now weighed which gives the second equation. X cc. of water times one, plus Y cc. of ore times its specific gravity equal the amount the 1,000 cc. weighs. Therefore, equation (2) would be as follows: X cc. of water plus the specific gravity of the ore times Y cc. of ore equals the weight read on the balance. Or shortened: X cc. plus specific gravity Y cc. equal W. W. is the weight read on the balance.

Examples:

Let X equal the number of cc. of which specific gravity is 1.0 equals water.

Let Y equal the number of cc. of which specific gravity is 2.44 equals ore.

Filling the density can with mill pulp to the mark gives the following equation:

X cc. water + Y cc. ore = 1,000 cc. which will be equation (1)
shortened X cc. + Y cc. = 1,000 cc.

This can with its 1,000 cc. of pulp is weighed at say, 1,317 grams. Equation (2) would be:

X cc. of water \times specific gravity 1.0 + Y cc. ore times its specific gravity would equal 1,317 or X cc. + 2.44 Y cc. = 1,317.

Subtracting equation (1) from (2).

$$(2) \text{ X cc. + 2.44Y cc. = 1,317}$$

$$(1) \text{ X cc. + Y cc. = 1,000}$$

$$1.44Y \text{ cc. = 317}$$

Solving for Y: 317

$$\frac{317}{1.44} = 220.1 \text{ cc. dry ore.}$$

Using 220 gives 220 cc. ore and 780 cc. of water; ratio would be 220 to 780 in volume.

The weight ratio would be 1,317 - 780 = 537 grams ore to 780 cc. of water.

The percent of solids would be 537 divided by 1,317 or 0.4077. This amount times 100 equals 40.77 percent solids.

Tailing Pond Overflow:

A narrow-neck flask would be more suitable in determining how much silt is carried in the overflow from the mill settling pond, and also the correct specific gravity, as the solids may be of lower specific gravity than the ore fed to the mill. The equation would be as follows:

$$\text{X cc. water + 2.44 Y cc. silt = 1,000.5 grams.}$$

$$\text{X cc. water + Y cc. overflow = 1,000 cc.}$$

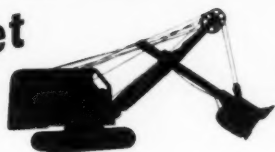
$$\text{Subtracting: 1.44 Y cc. = 0.5.}$$

$$\text{Then Y cc. = } 0.5 \div 1.44 = 0.347 \text{ cc.}$$

0.347 parts in 1,000 or 347 parts in a million.

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ELECTRIC SHOVELS: Bucyrus-Erie Co. electric shovels, equipped with Ward-Leonard electric control, are built for heavy-duty loading. For contact information, circle 3.

FLOTATION INDEX: The 1951 edition of Dow Chemical Co.'s Flotation Index, a complete guide to published material on flotation, is a must for mill men. Get your copy by circling No. 4.

THREE-PRODUCT HMS SEPARATION: The Akins separator is the heart of Colorado Iron Works Co.'s new HMS unit that produces concentrate, middling, and tailing in a single-stage operation. Get free information on the new unit by circling 5.

MOTOR STARTERS: A 12-page bulletin describing Allis-Chalmers Type H motor starters for 2,300 to 5,000 volt squirrel-cage, wound-rotor, synchronous and multi-speed motors has been released. Bulletin, "Type H Motor Starters," 14B6410A, will be yours if you circle No. 15 on the PEP postcard.

AUTOMATIC CAR COUPLER: The Willison automatic car coupler, manufactured by National Malleable Steel Castings Co., couples two haulage cars on contact, uncouples simply from a safe position, and eliminates slack between cars. For further information, circle No. 19.

MINE ROOF BOLTS: A newly published illustrated booklet describing Bethlehem Mine Roof bolts, bolt sets, plate sets, tie sets and channel sets, is now available upon request from MINING WORLD. Increased safety, more working space, increased production, faster movement and wider rooms are among the advantages gained by using Bethlehem Mine Roof bolts and accessories. Circle No. 22.

PIT MINING: Form A-307-NN, which documents its title, "International Tractors—Short Cut to Pit and Quarry Cost Control," shows how modern wheel and crawler tractors control the cost of pit mining. For form A-307-NN, circle 24.

EXCAVATION PRODUCTS: The Athey line of loaders, trailers, railroad, logging and other equipment is described in the 1951 issue of Athey Products Condensed Pocket Size Catalog. Get your copy of the catalog from your Athey-Caterpillar dealer, or circle 27.

DRAINAGE PIPE: ARMCOR Drainage & Metal Products, Inc., in a new 8-page folder, "An Economical Answer to Limited Headroom—Fast Runoff," describes, gives applications, test data, and case histories on the use of Armcopipe Arch and Multi-Plate Pipe Arch for culvert and other installations with minimum excavation. Circle 29.

TRACKMOUNTED JUMBOS: Features of Gardner-Denver Hydraulic Drill Jumbos offer faster set-up, creep-free booms, hydraulic roof jacks, up to 10-foot steel changes for more efficient use of tungsten carbide bits. Write for complete information to Gardner-Denver Co., Quincy, Illinois, or circle No. 30 on the MINING WORLD PEP card.

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CONCENTRATE STACKER: The Stephens-Adamson Swivel Piler is a light (approximately 450 pounds) stacker available in either fixed or wheel-mounted units powered by electricity or gasoline. Further information on this compact unit for enlarging your storage or stacking areas is available as "Bulletin No. SA-550." Circle No. 45.

SINGLE-DRUM HOISTS: Joy Manufacturing Company's new 16-page bulletin describes the complete line of Joy single-drum hoists for mining and surface work. Bulletin "Joy 76-X," with complete descriptions and specifications of hoists from 500 to 3500 pounds is driven by Turbinair, Pistonair, electric, or gasoline engines. Circle 58.

HOW TO SAMPLE COAL AUTOMATICALLY: Complete new booklet by Sturtevant Mill Co., Dorchester, Boston, 22, Mass., available from manufacturer or by circling 60.

RUBBER TIRED DOZER: LeTourneau 19 mph. Tournadozers reduce deadhead cycle by 2.5 to 1, offers increased mobility, making for drastic economies in stripping operations. For information on model circle 66.

SHOVELS, DRAGLINES: For information on Thew Shovel Company's line of shovels, cranes, draglines, clamshells, and hoes, in a variety of sizes and models that will perform virtually any loading job, circle 67 on the PEP postcard.

CONVEYOR BELT IDLERS: Catalog No. 785, published by Jeffrey Manufacturing Co., gives complete information on varied line of belt idlers, self-aligning, pivoted-type return, and many others. For your copy of this informative work, circle PEP No. 70.

CURVED JAW CRUSHER PLATES: Traylor curved crushing surfaces cut costs, improve crusher operation and outlast straight plates as much as 3 to 1. Further data obtainable by circling 78.

REVERSE FEED STOPPERS: New compact Thor drills ranging from compact Model 200 to heavy-weight 600 offer simplified design, air cushioning, extra bearing surfaces and other features to sharply reduce out-of-service repair time. For complete literature or on-job demonstrations, write to Independent Pneumatic Tool Co., Aurora, Illinois, circle 79.

MINE CARS: Pressed Steel Car Company, Inc., which has manufactured track haulage equipment for the mining industry for 50 years, carries a complete line of underground track haulage units: U-body mining tubs, three-way dump cars, Granby type cars, two side discharge cars, track parts, and car parts. For contact information on this line of products, circle 92.

HORIZONTAL AUGER DRILL: Drilling horizontal holes 4, 6, or 8" in diameter, the McCarthy self-propelled drill often drills 1000 to 1500' per day in shale, sandrock, and soft limestone. For a complete story on Salem Tool Co.'s McCarthy drills and a list of users, circle 94.

ELECTRIC SMELTING AND REFINING: Furnace applications for matte and speiss smelting, calcium carbide, non-metallic melting, ferroalloys, nonferrous refining and specialized applications. Write on company letterhead for complete book to MINING WORLD, or to Pittsburgh Lecomelt Furnace Corp., 324 32nd St., Pittsburgh, Pa.

Kue-Ken Crushers Now Sold Throughout World

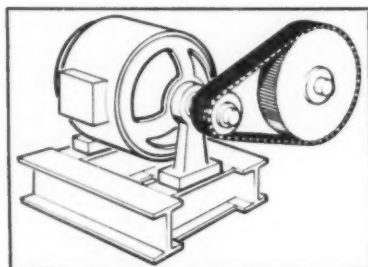
To meet the increasing world-wide demand for Kue-Ken crushers, Straub Manufacturing Co., Inc., has licensed W. G. Armstrong-Whitworth & Co. to produce and distribute the complete line of Straub mining machinery; Whitworth's exclusive territory includes Great Britain, Eire, Europe, South Africa, India, Pakistan, Australia and New Zealand.

Pennsylvania Crusher Co. continues production for eastern U. S. and Canada and Puerto Rico. Western Canada will be supplied by Straub from Oakland, California; by Armstrong-Whitworth from Gateshead-Upon-Tyne, England; or by Pennsylvania from Bath, Maine.

New Power Transmission Chain Drive By Morse

A revolutionary power transmission chain drive has been announced by the Morse Chain Company.

Featuring entirely new design principles and called Morse Hy-Vo (high velocity) Chain Drive, it provides—for the first time—a power transmitting medium



that combines the ruggedness and dependability of a gear drive with the smoothness and lack of vibration of a belt.

Morse Hy-Vo makes possible single drive units capable of transmitting as much as 5,000 hp. at linear speeds up to 6,500 feet per minute, or rotative speeds up to 3,600 rpm. A Hy-Vo drive only two inches wide has transmitted as much as 500 hp.

Morse officials state, however, that the current critical shortages of necessary materials have made it necessary to restrict orders for the new drive only to those with defense or essential ratings.

For more information circle No. 88.

Experimental Mine In New Research Center

The first experimental mine to be operated exclusively for the testing of mining equipment will be part of a new research center to be built by Joy Manufacturing Company. The mine will not produce any commercial mineral product.

The Joy Research Center will include a laboratory, work shop and other supporting facilities, as well as the mine. It will be located in Indian County, Pa., about 45 miles northeast of Pittsburgh.

The main research building will have an initial floor space of 15,000 square feet, and will have a flexible design to permit expansion.

The project is under the technical supervision of Dr. T. H. Troller, vice president in charge of engineering; and A. Lee Barrett, research engineer. Completion of the research center is scheduled this fall.

Folder Describes 22-Ton Rear-Dump Euclids

The Euclid Road Machinery Company has just published a 16-page catalog folder covering Models 31TD and 53TD Rear-Dump Euclids of 44,000 lb. payload capacity. Well illustrated, this catalog describes many of the important parts, such as the planetary drive axle, transmission, frame, hoists, etc., and contains specification data on the complete units. Circle No. 16 for form No. 120.

Explosion-Proof Electric Motors for Mining Use

General Electric's Small and Medium Motor Divisions announce the availability of a new line of explosion-proof motors which were tailored especially to the needs of the mining industry.

Representing the results of a survey of mining needs, the new line is available in ratings from 1½ hp through 60 hp at 230, 250, 500, and 550 volts, with stabilized shunt, compound, or series windings. Among the features of the new motors are these: Two stud-brush mechanisms with access to all brushes through hand-holes; cable gland design permits speedy cable replacement; Glyptal enamel insulation on all windings provides moisture-resisting insulation that is not subject to checking. For further information on these new mining motors, circle No. 87.

Hough Tractor Shovel Now On Crawlers

The Frank G. Hough Co. announces an outstanding new development in track-type 67 hp. gasoline or diesel powered tractor shovels, called the Model T12. It is a complete, integrated design of a

track-type tractor and shovel rather than a front end attachment for a conventional crawler tractor. Its basic advantages are the engine is mounted at the rear to provide maximum balance and stability, the operator is located high and forward where he has fullest visibility and there is a special full-reversing transmission that provides four forward speeds and four corresponding but faster reverse speeds. Forward-reverse or directional shift is separate from the regular shift and is quick and easy acting. For further information circle No. 99.

Tracto-Loader Features Torque-Converter Drive

A new wheel tractor loader, the TL-10 Tracto-Loader manufactured by Tractomotive Corporation of Deerfield, Illinois, incorporates a torque-converter drive and an entirely new clutch-type transmission in a mobile ¾-yard truck loader. The unit has four forward, four reverse



speeds, and is powered by an Allis-Chalmers 40.5-hp. gasoline engine.

Simple to operate—the operator can go forward or backward by simply pushing or pulling on one lever—the TL-10 is sold exclusively by Allis-Chalmers Industrial tractor dealers. For complete information on this mobile, versatile loader, circle No. 89.

Allis-Chalmers Names New Western Sales Reps

Arthur B. Kinley and Wayne L. Smith have been named general machinery division sales representatives in Allis-Chalmers district offices in the West.

Kinley has been assigned to Allis-Chalmers Spokane office, where he will specialize in selling equipment for the cement, mining and rock products industries. Smith, an electrical engineer, is now with the Denver district office.

WEMCO Opens New Office in Hibbing

Western Machinery Company announces that it has moved to new offices in the Northland Greyhound Bus Depot at 1933 East Fourth Avenue in Hibbing, Minnesota. The new offices were completely refurbished especially to accommodate engineering and drafting facilities, and will enable WEMCO to provide improved sales and engineering services.

PEP Editor

MINING WORLD-WORLD MINING

Please send me complete and free information on the following equipment described in your PEP section, and keyed by the numbers I have circled:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
CIRCLE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
NUMBERS	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
YOU	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
DESIRE	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Also send further free information on the equipment advertised on page:

____; Product _____; Manufacturer _____

____; Product _____; Manufacturer _____

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Continued from Page 22

Charles H. Dunning, director of the Arizona Department of Mineral Resources, has resigned to enter private business. **Roger I. C. Manning**, field engineer for the department, has been named to succeed Dunning.

Lorin McHenry, **Henry Faulk** and **Merritt Peterson** have returned to Livengood, Alaska, to work for the Callahan Zinc Lead Company, now opening season operations.

Kenneth Kadow has become the administrative head of the U.S. Tin Corporation, Juneau, Alaska. The company mines on Lost River in the Seward Peninsula, and besides placer mining this summer will start lode mining for the first time. Kadow recently resigned as chairman of the Alaska field committee.

Anthony N. Bennett of Glendale, Arizona, has been appointed state mine dust engineer. He replaces **Howard L. Hartman**, resigned, who is now an instructor in mining at the University of Minnesota and is working toward a doctorate, specializing in mine ventilation.

D. N. Vedensky of San Francisco, California, has been named director of research and development for the M. A. Hanna Company and will move to the company's Cleveland, Ohio, office. He had been a partner and chief metallurgist in the Pan American Engineering Company, San Francisco, but has been doing consulting work for Hanna for several years.

Ty Maki, former physics professor at Marquette University and now laboratory technician of the Dings Magnetic Separator Company, has transferred from Milwaukee to Hibbing, Minnesota, where he will be during the entire iron ore producing season. He will provide assistance and advise in the operation of magnetic equipment.

Arno C. Fieldner, former chief of the U.S. Bureau of Mines' Fuels and Explosives Division, has been named Chief Fuels Technologist on the staff of Bureau Director **James Boyd**, Washington, D.C. Fieldner will be succeeded in his previous position by **Louis D. McCabe**, who had been assistant chief.

Robert L. Menk of Golden, Colorado, was named outstanding senior for the year at Colorado School of Mines during the 17th Annual Engineers Day recently held at the School. Other students named outstanding in their respective classes were **Lloyd E. Best** of Bakersfield, California, a junior; **Richard B. Banks** of Denver, a sophomore; and **John C. Owings** of Klamath Falls, Oregon, a freshman.

A. J. Hermann of Hibbing, Minnesota, has retired from his position as superintendent of the electrical department, Oliver Iron Mining Company, and will move to Tucson, Arizona, to live.

Richard A. Matuszeski is leaving his post as metallurgist and chemist-assayer with the New Mexico Bureau of Mines and Mineral Resources to join the Tungsten and Chemical Division of Sylvania Electric. He held the state post in Socorro for five years.

M. E. Newlove, former general manager of the Resurrection Mining Company at Leadville, Lake County, Colorado, has accepted a position with the American Smelting and Refining Company and will go to Africa for the company.

Gordon T. Brown is now mine engineer for the Copper Canyon Mining Company, Battle Mountain, Nevada. A 1939

graduate of the Colorado School of Mines, he had held jobs with the Mountain City Copper Company, Nevada; the Cerro de Pasco Copper Corporation, Peru; the Bunker Hill and Sullivan Mining Company, Idaho; Gray Eagle Copper Company, California; American Smelting and Refining Company, Arizona; and the T. A. Dodge Enterprises, Tucson, Arizona.

Julian Moore has been made manager of the Basic Magnesium Plant at Henderson, Nevada, and **Don Ashbaugh** has been made secretary of the Nevada Colorado River Commission, which controls Basic. **Governor Charles H. Russell** made the announcements.

Joseph W. Joyce recently succeeded **Franklin H. Sharp** as a metallurgist at the Washington State College mining experiment station, Pullman. Joyce had

been assistant mill superintendent for The Vermont Copper Company, South Stafford, Vermont. Sharp is now mill superintendent with Alder Gold-Copper Company at Twisp.

Franklin B. Merrill has been made division traffic manager for Kennecott Copper Corporation, Utah Copper Division, Salt Lake City, Utah. He succeeds **Thomas H. Perleywits**, retired.

O. Jalmer Anderson, former assistant master mechanic for Butler Brothers Mesabi range mines, is now master mechanic for the Reserve Mining Company, Beaver, Minnesota.

William S. Baxter is doing special engineering work on the Gogebic range for the Montreal Mining Company. He had been assistant superintendent of the Castile Mining Company, Ramsay, Michigan.



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precipitates—SOUTHWEST

Kennecott Planning New Copper Mine at Ruth

At an initial cost of \$7,000,000 Kennecott Copper Corporation's Nevada Mines Division at McGill will develop a new copper mine to be called "The Deep Ruth," according to J. C. Kinnear, Jr., manager. The mine will be developed on three levels, the lowest at 1,360 feet, and mining will be by block caving. The orebody is considered an extension of the original Ruth orebody and contains an estimated 22,500,000 tons.

Shaft sinking to a depth of 1,575 feet will begin immediately, reconditioning and enlarging of the auxiliary incline shaft is planned, eight miles of underground haulageways will be driven, part of the town of Ruth will be moved, and a railroad spur will be built to the mine site. Mining will start in about two and a half years.

The new mine will require an estimated expenditure of \$13,000,000, but it will add substantially to the years of life for the property.

Atwood Mine is Increasing Silicious Copper Output

Ira L. Moseley, Lordsburg, New Mexico, operating the Atwood copper mine three miles south of Lordsburg under a sub-lease from C. H. and S. A. McIntosh, operators and lessees of Atwood Copper Mines, is now shipping six or seven railroad cars of silicious copper-silver-gold ore weekly to the American Smelting & Refining Company's El Paso, Texas, smelter.

The mine is developed by a three-compartment vertical shaft in the footwall and crosscuts extending to the vein at 125-foot vertical intervals. The steep vein is mined by shrinkage stoping, in which the stopes are 100 feet long unless intersected by vertical faults. The de-

velopment drifts are driven partly in the hanging wall, partly in the vein. Sill development consists of a manway, chute, two blind sets, chute, two blind sets, chute, two blind sets, and a manway in repeated sequence.

Since early February, Moseley has cross-cut to the vein on the 750, has drifted about 450 feet on the vein, has one stope 40 feet up in the ore, and is timbering on the sill for a second stope. Drifts are driven with two Gardner-Denver CF-79 column-mounted drifters, and muck is picked up with two Eimco 12B Rocker-Shovels. Stopes are drilled upward (the ore is hard) with five Ingersoll-Rand R-5 stopers. When the second shrinkage stope is put into production, Moseley expects a nearly doubled production—to about 12 cars per week—without increasing the force of 19 men who are now working the mine.

Nevada-Scheelite's Output Being Increased 50%

Kennametal, Inc., of Latrobe, Pennsylvania, which recently acquired the mine and mill of Nevada Scheelite, Inc., near Rawhide, Nevada, plans a 50 percent increase in output of concentrates. According to Philip M. McKenna, president of Kennametal, additional grinding and flotation units will be installed in the mill. A program of core drilling also has begun. Present production satisfies less than one-third of Kennametal's needs in producing hard carbide metals for tool-making in its shops at Latrobe.

A. R. McGuire, mining engineer of Fresno, California, is managing the property and will probably be made president of the Nevada Scheelite company; Ernest Colwell, superintendent of the mine and mill, will continue in that capacity; Arthur Challstrom, in charge of the Fallon, Nevada, office, will continue as accountant and buyer; and Donald C. McKenna, vice president of Kennametal, will be

made secretary and treasurer of Nevada Scheelite.

U.S. Smelting's Mines Active in New Mexico

The Bayard Unit of the U. S. Smelting, Refining and Mining Company is working a total of 120 men at its Bullfrog, Slate and Princess shafts. Two shifts are working in the Princess, one at each of the other shafts. The ore is going to the company's Bayard mill.

Development work is being done at the Princess Section, and the company has given the following leases: A section of its Fierro iron ore deposit to R. W. Mathis, who is shipping about 200 tons daily to the Colorado Fuel & Iron Corporation at Pueblo; its Davidson tunnel area between Fierro and Shingle Canyon to J. H. Thompson, who is taking out some copper ore; its Shingle Canyon mine to Bruce Leake, ex-deputy state mine inspector, who is shipping some 300 tons of lead-zinc ore monthly to the company's mill; its Pearson section in the Fierro district to Strong and Harris, who are shipping about 1,000 tons of zinc ore monthly to the company's mill; and a lease on some mine dumps and surface outcroppings to Douglas White, who is doing some experimental copper leaching work.



After several months of investigation, the Central Eureka Mining Company of Sutter Creek, Amador County, California, definitely has decided to extend its oper-

A DRYWASHER NEVER KNOWS IF HE'LL HAVE BEANS OR STEAK

On the desert 18 miles northeast of Barstow, California, Caspar E. Dodson is operating a homemade drywasher. The small tailing stacker belt on the left is made from a fabric belt with corned-beef cans for buckets. The entire unit, consisting of a dry riffled jig and the tailing stacker, is powered by a Briggs & Stratton, 1½-hp, air-cooled gas motor. Gold lies near the surface in spots where the wind has blown lighter sands away and concentrated the residual gold. The biggest nugget Dodson has found to date sold for \$3.17; usually the gold is medium fine (about wheat-grain size) and sometimes runs as fine as 50 mesh.



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ations into the copper mining field in Arizona. (Central Eureka is the largest mother lode gold producer in California.) According to President J. D. Swift, the company has obtained leases with options to buy three Arizona properties.

Operators of the Randolph mine, 21 miles northwest of Superior, Arizona, are putting in roads, prospecting by shafts, drifts, and trenching and otherwise blocking out ore for later production. The Randolph, at an elevation of 3,000 feet, is a vein deposit carrying lead, zinc, copper, gold and silver at a contact between granite and monzonite. The nearly vertical vein varies in width from about five to 30 feet. With early completion of a road usable by heavy trucks, initial shipments of hand-sorted, high grade ore will be made.

Lloyd Jennings and Wiley Cochran of Elizabethtown, Illinois, and Clyde Flynn, Jr., of Tucson, Arizona, have formed the Mid Continent Mining Company with offices at Elizabethtown and have purchased the Lone Star mine in Arizona from the Fluorspar Producers Corporation of Los Angeles. The mine is located in the Whetstone Mountains, 15 miles southwest of Benson, and has been Arizona's leading fluorspar producer. It was discovered by M. W. Frye and William Green of St. David in 1946, then sold to Cooper Shapley, Jr., of Phoenix, who retained ownership until July of 1950. At that time it was purchased by the Pepperdine Foundation of Los Angeles. Six months ago Fluorspar Producers Corporation acquired it from Pepperdine. Production started in September, 1946, and had amounted to as high as five cars per month, the ore averaging 92 percent CaF_2 with only two percent SiO_2 . In 1950 production dropped somewhat due to time lost in deepening the shaft an additional 50 feet to the 200 level. The new owners are said to be planning further expansion, including deepening the shaft, construction of a new ore bin and diamond drilling.

The Fernstrom Operating Company has launched a new development program at the Las Guijas mine, owned by the Tungsten Mining Corporation of New York. Lester Fernstrom, Box 51, Ruby Star Route, Tucson, Arizona, is in charge.

From 100 to 150 tons of zinc-lead-copper ore are being shipped monthly from the Kansas and Dudley Standard mines in the Patagonia district. The property, owned by Duquesne Mining Company, is operated under lease by R. L. Brown, Box 182, Tombstone, Arizona. He is employing seven men. At the Empire mine, also owned by Duquesne Mining Company and leased by Brown in association with the De La Ossa brothers, 100 tons of zinc-lead-copper ore monthly are being mined from development work. Two shafts are being sunk in ore and a drift is being driven along the vein. Nine men are employed.

The Re-organized Silver King Divide Mining Company reports rapid progress in its exploration program at the Mount Union mine, Prescott, Arizona. The new six by eight-foot tunnel has been advanced 700 feet, or one-half of the distance to cut the old shaft just below the 500-foot level. Equipment includes drills, an Eimco power shovel loader, ventilating equipment, and a 240-foot compres-

sor. A warehouse and change room have been erected. Burhl Dykhous is general superintendent, directing a crew of nine men on a two-shift basis. The Mount Union, which was closed in 1906, has a production record of \$125,000 in gold and \$25,000 in silver. The present development program is to open ore deposits with values in gold, silver, lead and zinc.



A uranium deposit has been discovered

by William Fischer, field engineer of the Natural Resources Developing Company of Los Gatos, California, in the Inyo-Mono County area. According to LeRoy H. Halvorsen, vice president and manager of the company, the strike is about 40 miles from Bishop. Testing is under way.

Idaho Maryland Mines Corporation, operating at Grass Valley, California, has discovered an orebody which may assure 15 to 20 years of further productive operations, according to Albert Crase, president. The orebody was found in a newly prospected area and consists of six parallel veins dipping through the area between the 2300-foot level and the bottom of the Brunswick mine. Development is under way. Also, the com-



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pany has applied for DMA help to reopen and rehabilitate the *Union Hill* mine for recovery of tungsten.

The *Enriquita* quicksilver mine may be reactivated by L. A. Purinton of San Jose, California. The mine is on the Guadalupe River near San Jose, and Purinton plans test drilling of the large tailing piles as soon as the river level falls and will use a suction dredge for recovery of the metal.

From Los Angeles, California, the *American Potash & Chemical Corporation* reports that shipments in tons dur-

ing 1950 were the largest in the company's history, yielding a net income of \$2,559,911, nearly a million dollars more than in 1949. The company mines potash at Trona.

Buckman's Inc., manufacturer of mercury chemicals, Memphis, Tennessee, is reported to have taken over the *Geyser* mercury mine in the Geyser Peak district, Sonoma county, California. The mine was operated by the *Geyser Development Company* and lessees during World War II. Buckman's will operate the mine and use the mercury in its chemical business.



The *Molybdenum Corporation of America* is negotiating for part of one of the *Basic Magnesium Plant* units at Henderson, Nevada, according to plant manager Julian Moore. The company has a mine near Mountain Pass and is interested in establishing an electrolytic plant in the general area. Application was made by the company to the Colorado River Commission for 8,400,000 kw. hours of power yearly. If a unit of Basic cannot be obtained the company reportedly will build a plant at Jean, Nevada. Meanwhile the Colorado River Commission advised that the sale of the state-owned plant to present lessees was being negotiated.

Several more Nevada tungsten mines are reported opening, including the *Lucky Four* mine southeast of Schurz, the *Mt. Wheeler Mines, Inc.*, in the Ely region, and the *Alpine* mine near Gardnerville. The *Lucky Four* is being reactivated by John B. Siri of Tonopah and Goldfield with the assistance of three men who are installing a hoist, compressor and other machinery. The mine has one shaft and several drifts, crosscuts and raises. When in production, tungsten will be sent to the *U. S. Vanadium Company's* custom mill at Pine Creek, California. *Mt. Wheeler Mines*, a subsidiary of *Combined Metals Reduction Company*, is driving an adit on the *St. Lawrence* mine property on the west side of Snake Range south of *Mt. Wheeler* and just below the old mine site. V. E. Jeppson is foreman. The *Alpine* mine and the *Pine Nut* mill of the *Alpine Mining Company* have been leased to R. D. Morris, former manager of the *Alpine* company, which ceased operations about two years ago. Morris is operating under the firm name of *R. D. Morris-Alpine Mine Lease*. The property is in Hope Valley, near Gardnerville.

Golden Century Industries, Inc., of Salt Lake City, Utah, is doing development work at several Idaho and Nevada properties. In Nevada, the *Juanita* gold mine, 100 miles northwest of Winnemucca, has been equipped with a compressor, hoist and other machinery and testing is underway. The *Black Eagle* manganese property south of Battle Mountain, where the U. S. Bureau of Mines did diamond drilling and trenching during World War II, and the *Carico Lake* manganese property 55 miles south of Beowawe are being sampled; leaching tests are underway on ore from the latter. The company has acquired numerous claims known as the *Copper King* holdings 13 miles north of Carlin, in the *Maggie Creek* mining district, *Eureka County*, and is mapping these claims in detail. At the *Copper King* mine a 100-foot shaft has been sunk and a crosscut is being driven from it to an old caved shaft. The mine contains copper, and



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Some iron has been found in the nearby claims. The company also acquired from the Good Hope group five patented claims and a millsite on Maggie Creek. These claims contain lead and silver principally. In Idaho, one of two placer mines in which the company is interested is being tested for monazite.

NEW MEXICO

The American Smelting & Refining Company is adding another 200-ton unit to its mill at Deming, New Mexico. With lead-zinc mining on the upswing, the company's mill is running to capacity. The new section, expected to go into operation early in July, will provide further incentive to the minor producers of lead-zinc ore in the Southwest. Facilities for receiving lots by railroad or truck and for sampling are excellent. The 200-ton section will be self-contained from sampling plant to filters, including ball mill and classifier, flotation cells for lead and zinc concentrates, with weightometer and automatic samplers for accurate process control.

The Socorro Corporation's manganese property near Socorro, New Mexico, has been bought by the Southwest Minerals Industries, a Massachusetts trust which controls the Artillery Peak manganese deposit in Arizona. Heading the organization are George K. Kremm of Chicago, D. D. Corum of Warrensburg, Mo., and George F. Foster of Los Angeles. The men reportedly expect to put the Socorro development on a 24-hour basis.

The Ozark-Mahoning Company of Rosiclare, Illinois, is said to be developing the White Eagle fluorspar mine north of the Cook's Peak range, north of Deming, New Mexico.

The New Mexico Geological Society held its annual meeting at Albuquerque, New Mexico, April 6 and 7. C. B. Read of Albuquerque, senior geologist for the U.S. Geological Survey was elected president for the year. Among other officers, W. B. Hoover, Albuquerque, geologist for the Humble Oil and Refining Company, was elected first vice president; John E. Allen, Socorro, professor at the New Mexico Institute of Mining and Technology, second vice president; Eugene Callaghan, director of the New Mexico Bureau of Mines, secretary-treasurer. Some 150 members from New Mexico, Texas, Colorado, Utah, and Arizona heard a diversified program including a conference on the Jurassic stratigraphy of the Colorado Plateau and adjacent areas and technical sessions.

The Metal Research and Development Corporation of Denver, Colorado, has begun work reclaiming silver in New Mexico. Jack Raschlaub heads cyanide leaching operations on dumps on several old properties in the historic Hermosa (Palomas) mining district, where discoveries of silver date to 1879.

The Burro Chief Mines of H. E. McCray now includes leases on extensive lead-zinc properties in the Cooks Peak area, 32 miles from Deming, belonging to the Mahoney interest, the American Smelting and Refining Company, Poe and Riley George. McCray is subleasing parts

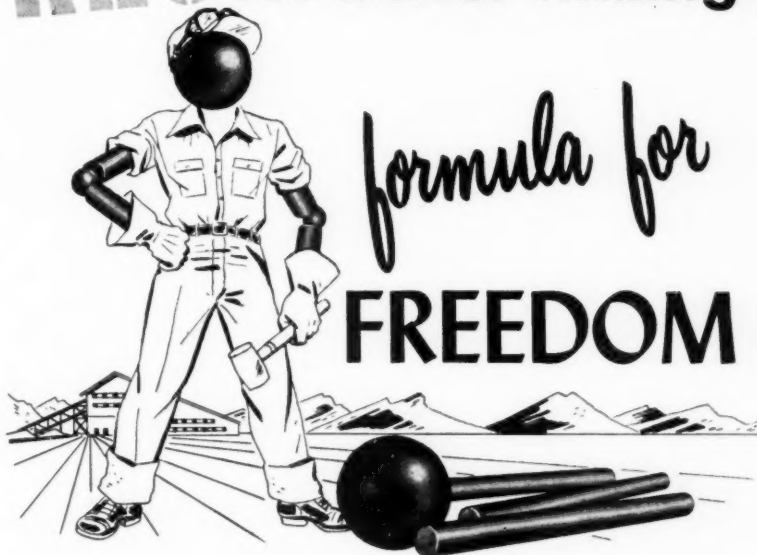
of the area to several individuals, including Delbert Mangus of Glenwood who recently closed down a Glenwood fluorspar property. Lead and zinc sulphides are being shipped to the AS&R mill at Deming and lead and zinc oxides will be shipped to the AS&R smelter at El Paso, Texas. The Burro Chief also is producing fluorspar from the Greenleaf and other properties 12 miles northeast of Deming. Highest grade production is being shipped to Cleveland, Ohio, and the milling-grade fluorspar to the General Chemical Company's Deming mill and Zuni Milling Company's Los Lunas mill.

The General Chemical Division of the Allied Chemical & Dye Corporation is operating its Shrine mine at peak capacity and is doing some development at its Florida mine. The firm's Deming, New Mexico, mill is going full speed, with custom ore purchases plus the company's own mine production allowing full-capacity operation.



The International Mining Corporation of New York, in association with the Denver Engineering Company, a subsidiary of the Denver Equipment Company of Denver, Colorado, has sponsored a project to erect a manganese concentration plant at El Paso, Texas, to treat manganese ores from the Borregos District in northwestern Chihuahua, Mexico. The project includes the treatment of manganese ores from other properties in northern Mexico and the southwestern United States on a custom basis. The companies involved have applied to the U.S. Government for aid, which, if given, will lead to the immediate erection of the plant.

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CONSOLIDATED URANIUM MINES, INC. IS MINING AND SHIPPING ORE FROM TEMPLE MOUNTAIN

The Temple Mountain mining district, Emery County, Utah, is rapidly becoming a major producer of uranium ore, and Consolidated Uranium Mines, Inc., with more than 110 claims in the area, leads in production as well as in the size and scope of its exploration and development programs. Operation of the properties is being directed by Minerals Engineering Company of Grand Junction, Colorado, in accordance with an agreement with Consolidated. In the past year, 1,000 truckloads (exceeding 11,000 tons) of ore have been mined from Consolidated holdings and marketed at authorized processing plants.

At South Temple wash a large camp with facilities for 40 men has been constructed. The company has a large drilling program under way at Temple Mountain using special wagon drills and diamond drills, and at least 18,000 feet of holes have already been drilled. Underground development openings are being driven preparatory to extracting ore thus far indicated by drilling. Plans for increasing the rate of development and mining are being made, and new heavy-duty equipment, including air compressors, a Diesel loader, and a complete mining plant have been acquired. The company is now ready to expedite production in seven areas now producing and to commence operations in new areas where drilling has indicated sufficient ore.

To facilitate the movement of men and supplies, Consolidated has constructed or repaired about 20 miles of access roads in the Temple Mountain area, and the State of Utah has improved the Hanksville-Greenriver road over which traffic moves to and from Temple Mountain.

In the Temple Mountain area uraniferous deposits in asphaltic sandstone beds are found, for the most part, in the basal member of the Shinarump conglomerate. Most of the uranium is intimately associated with, and contained in, blebs, seams and impregnations in the asphaltic material. Black powdery covellite and rautite (hydrous vanadates) are found intermixed with pyrite. Several recognizable uranium minerals are found including carnotite, autunite, torbernite, and zeunerite (a copper-uranium arsenate). The outline of the orebodies is erratic, generally not more than a few hundreds of feet in length and width, and usually less than three feet thick. As a general rule the uranium concentrations coincide with the highest asphaltic-bearing beds. Mineralized fossil wood logs, twigs and leaves have formed high grade ore in several of the mines.

Besides the Temple Mountain operations, Consolidated, in cooperation with the Utah Uranium Corporation, is now building some 30 miles of road from South Temple to the Sinbad-Muddy River area. Here, a new uranium district recently was discovered and gives promise, in its

Shinarump formation, of becoming of major importance. In a three-week period, a large camp was constructed, equipment moved in, and mining operations were begun. Consolidated and Utah Uranium hold the principal properties in this area. Trucks are carrying ore to processing plants via an old wagon road until the new road is completed. Five tractor-dozers are building the road and when it is completed access roads will be built just under the outcropping Shinarump formation so that various new mining operations can be started at points where sampling has indicated uranium of ore grade.

Consolidated officials include E. G. Frawley of Salt Lake City, president, and Roy A. Hardy, mining engineer and geologist of Reno, Nevada, and Clyde E. Collins, mining engineer of Carson City, Nevada, directors. Officials of Minerals Engineering Company are Blair Burwell, president; Ray G. Sullivan, vice president and general manager; and Arch F. Boyd, secretary. Boyd has been supervising the field operation.

Utah Copper Div.'s 1950 Output Nears Record

Kennecott Copper Corporation's Utah Copper Division almost topped the 1944 near-record production of 555,067,885 pounds by producing 554,995,248 pounds of copper in 1950, according to officials. In 1950 Utah Copper moved 41,342,160 tons of overburden or waste and produced 31,037,800 tons of ore. One reason for the high production was the return to a seven-day operating week, according to J. P. Caulfield, manager of the Division.

In May, 1951, the slimes treatment and doré furnace sections of the precious metal refinery of the electrolytic copper refinery at Garfield had begun operating seven days a week to take care of a backlog of slimes. The refinery recovers gold, silver, selenium, tellurium and platinum group metals from anode slimes from the tank house.



The Standard Mining Corporation, a subsidiary of the Standard Ore and Alloys Corporation, 120 Wall Street, New York, has been organized to explore, develop and mine uranium-vanadium ore on the Colorado Plateau. Headquarters have been established at Grand Junction, Colorado. Mining claims have been purchased, machinery is being shipped in and new equipment including three diamond drills have been acquired. Charles

W. Yetter is Colorado manager for the corporation.

The new Carlton mill of the Golden Cycle Corporation in the Cripple Creek district, Teller County, Colorado, is treating ore from Golden Cycle's Cresson, Portland and Ajax mines, and custom ore is being bought and milled from Brown and Denman, and Ferguson and Kumet, who are operating the Mollie Kathleen mine on a lease. Other custom ore shippers are John Robush from the El Paso mine and L. W. Andrews from the South Burns mine. Max Bowen is vice president and general manager of Golden Cycle.

The Climax Uranium Company is engaged in a research program to determine the economic feasibility of recovering by-product selenium at its Grand Junction, Colorado, uranium-vanadium mill. Selenium-bearing uranium-vanadium ores from two Utah mining districts, Temple Mountain in Emery County and Cactus Rat in Grand County, are known to have a higher-than-average selenium content. Blair Burwell is general manager.

The Old Hundred Gold Mining Company has started operating its mill in Cunningham Gulch, San Juan County, Colorado, treating lead-zinc-silver-bearing sulphide ores from its Gary Owen mine. The mill has been repaired and new equipment installed. Ore is delivered to the mill from the mine over a 4,000-foot long aerial tram. Ben F. Webster, Jr., is general manager and Robert Sayre, Jr., is superintendent. Both men reside in Silverton.

The Leadville Drainage Tunnel being driven by the Utah Construction Company for the U. S. Bureau of Mines has passed the 8,700-foot point. The breast is in sandy dolomite. The contact between the underlying Sawatch quartzite and the Peerless shale was at the 8,573-foot point. A 15-inch-wide fissure vein along a fault has been found to carry silver-lead-zinc-copper-gold mineralization. A passing switch has been placed near the breast and should facilitate tunneling progress. John H. East, Jr., first Director of Region IV, with headquarters in Denver, released the report of progress.

Major plant expansions at the Climax mine of the Climax Molybdenum Company, Lake County, Colorado, are now underway following recent authorization of Climax management. The mill capacity is to be expanded by 5,000 tons per day with the new unit scheduled for operation by mid-1952. The by-product plant is to be enlarged to treat 20,000 tons per day of molybdenite tailing for the recovery of tungsten, tin, pyrite and other minerals. The plant addition will incorporate equipment designed to increase materially the tungsten recovery. The enlarged plant probably will be in operation before the end of 1951. A new crushing plant will be built at the Storke level, which is 300 feet below the main mining (Philipson) level. A conveying system will be built from the new

crushing plant to the existing No. 2 crushing plant. These units will not be in operation before 1953. A new 26-inch diameter steel water pipe will be installed between the Robinson pumping plant and the mill. The Stearns-Roger Manufacturing Company of Denver has a contract for the plant additions under the direction of Climax's officials. W. J. Coulter is vice president and general manager in charge of mining for Climax.

UTAH

The American Metal Mining Company is continuing exploration and development work at its mines in the Big Cottonwood Canyon district, Salt Lake County, Utah, while awaiting approval of its request to DMA for participating funds in the project. The request (DMA-560) covers the property owned by the company. The project is expected to cost \$93,250. Charles S. Woodward, company president, announced the negotiations with DMA.

Development work on properties controlled by the American Fork Consolidated Mines in American Fork Canyon, Salt Lake County, Utah, has opened up a vein carrying silver-lead ore, according to N. J. Nielson, president. Continued development of the vein is planned, and all ore from development is being stockpiled at the mine.

Uraninite, torbernite and autunite uranium ore is being shipped to the Salt Lake City refining plant of the Vitro Chemical Company from the AEC's ore purchasing depot at Marysville, Piute County, Utah. The Vitro company has entered into a contract with the AEC to treat the ore from the Marysville district at its new plant. M. G. McGrath is vice president.

The Dragon Consolidated Mining Com-

pany is mining about 6,000 tons of halloysite clay per month from its Dragon mine, Juab County, Utah. The company is continuing development through its Dragon No. 1 shaft and is cleaning out caved workings above the 150-foot level. The clay is shipped to the Salt Lake City plant of the Filtrol Corporation. John F. Dugan, general superintendent of mines for the International Smelting and Refining Company, is in charge of operations at the mine, an International subsidiary.

Plumbic Mines Company has resumed exploration work at its Jeepster claims in the Marysville, Piute County, Utah, uranium district. In 1950 the company sank an incline shaft 400 feet and drove a crosscut north from the incline's bottom. The crosscut will be extended northerly an additional 300 feet. Plumbic is a subsidiary of Tintic Lead Company. Paul H. Hunt is president of both companies.

The United States Smelting, Refining and Mining Company has purchased all mining property and assets of the Ohio Copper Company. The Big Indian group of copper claims in San Juan County and a group of claims in the Wet Mountain (Bingham) district, Salt Lake County, were included in the purchase. During World War II, Ohio Copper operated a 250-ton per day mill at the Big Indian copper mine and a 1,500-ton per day tailing retreatment plant at Lark, Utah. Since 1948 the company has prospected and explored the Lark limestone on the 1,100-foot level of its Lark mine. W. C. Page, Salt Lake City, is vice president and general manager of the western operations of USSRCO.

The Joy Manufacturing Company has eight diamond-drill rigs in operation in the Cottonwood Canyon uranium-vanadium district, San Juan County, Utah. Drilling is being done for the United States Atomic Energy Commission as part of its stepped-up exploration program.

Three Grand County, Utah, producers of uranium-vanadium ore are expected to increase production of ore during the months ahead. They are Abe Day, mining on his own group of claims on La-Salle Creek; Bowles and Heflin, mining near Moab; and E. F. Long, leasing the Cactus Rat group of claims southeast of Thompsons from the Climax Uranium Company.

Additional details of the Federal government's program to aid transportation of uranium ores in Utah have been announced by Frank MacPherson, manager of the U. S. Atomic Energy Commission's Colorado Raw Materials Office, Grand Junction, Colorado. In San Juan County \$250,000 will be spent on the all-weather road from Hite to Blanding, and \$473,000 will be spent in improving the road from White Mesa Hill, 14 miles south of Blanding, to Mexican Hat, a distance of 34 miles. The new 220 foot bridge across the San Juan River is included in this construction job. In Grand County, road improvements to the Polar Mesa uranium-vanadium mining district are scheduled. Improvement of roads in that district will facilitate ore shipments from the W. E. Lile & Son's operations. The Liles are leasing from the U. S. Vanadium Company. In Emery and Grand Counties, 90 miles of road improvements and 10 miles of new construction in the Henry Mountains are estimated to cost \$261,000.

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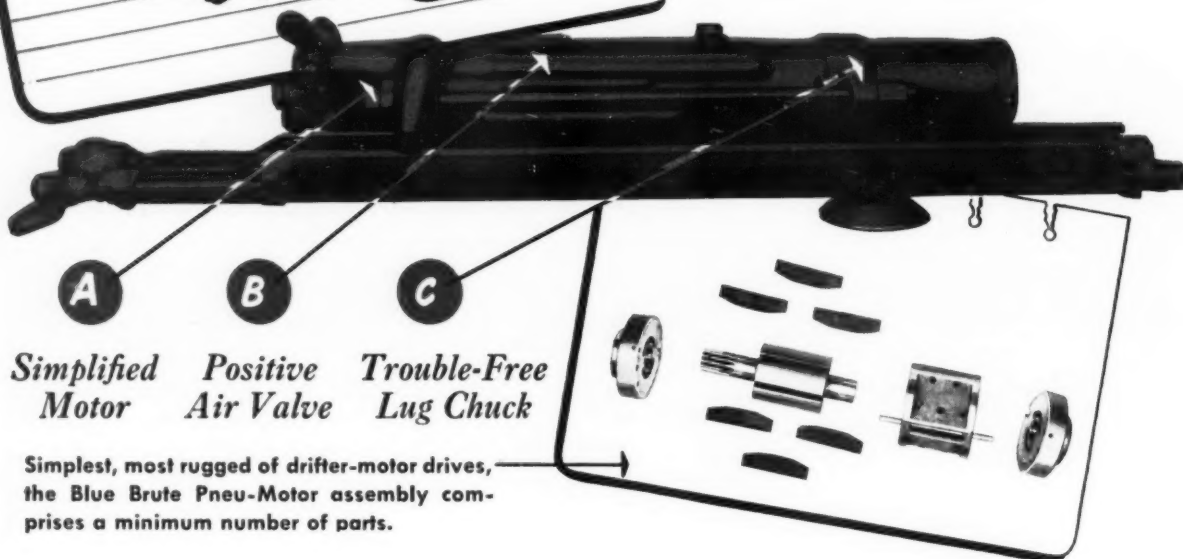
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precipitates—NORTHWEST

Silver-Lead-Zinc Strike Made In Dominion Mine

Earle B. Gibbs, owner of the Old Dominion mine near Colville, Washington, has reported a strike of silver-lead-zinc ore in the mine of extraordinarily high value. General mine-run sampling across the entire vein was said to have assayed 98.3 ounces of silver, 12 percent lead and 17.4 percent zinc.

The ore was found during the course of extending a 150-adit (driven in 1883) about 1,400 feet. Gibbs said they drove through the vein, hit a fault, and then began driving into what appears to be another vein. The first vein is now being drifted on both east and west.

Gibbs and Ira M. Hunley of Spokane recently sold the nearby Bonanza mine to the Anaconda Copper Mining Company after finding ore in that long-abandoned property.

New Company to Develop Atlas Mine in Idaho

To explore and develop properties of the Atlas Mining Company near Mullan, Idaho, a new company is being formed by the Newmont Mining Corporation of New York, the New Jersey Zinc Company of New York, and Hecla Mining Company of Wallace. Shareholders of Atlas and of the Coeur d'Alene Lead Company, which owns part of Atlas' stock, voted for the project recently.

One of the new company's three option terms proposes further sinking of the 800-foot Atlas shaft to the 2,400-foot level and doing a minimum of 2,000 feet of lateral exploration on or below that level. Hecla in 1940 sank the Atlas shaft to the present depth and did 1,300 feet of exploratory work on the 800 level before giving up its option in 1941. Completion of any one of the option terms will result in the acquisition of the Atlas property by the new company.

President of Atlas is Roger W. Greenough, who organized the company in 1924. Officers of the new company, which may be called the Shoshone Mining Company, have not been announced. Work will start at the property within two months.

Aluminum Firms Receive DPA Certificates

The Defense Production Administration has awarded certificates of necessity to encourage expansion of production and additions to plant facilities to the following companies:

Harvey Machine Company, Kalispell, Montana, \$94,700,000 (of \$95,000,000 applied for) with an 85 percent certification; Reynolds Metals Company, Corpus Christi, Texas, \$78,365,278 (of \$79,665,278 applied for) with an 80 percent certification; Kaiser Aluminum & Chemical Corporation, Mead, Washington, all of the \$6,234,506 applied for eligible at 80 percent certification; Reynolds Metals Company,

Jones Mills, Arkansas, all of the \$4,300,000 applied for at an 80 percent certification; Reynolds Aluminum Company, Troutdale, Oregon, all of the \$475,450 applied for at an 80 percent certification; Aluminum Company of America, Alcoa, Tennessee, all of the \$912,000 applied for with an 80 percent certification; and, at Port Lavaca, Texas, \$5,209,375 (of \$43,564,618 applied for) at an 80 percent certification.



A lead-zinc strike has been reported by Sunset Minerals, Inc., in its Liberal King mine on Pine Creek near Kellogg, Idaho. The ore was found off the 800 level in a previously unexplored, northwestern section of the mine, according to Bliss Moore, vice president and general manager. A raise has been driven on 10 feet of ore above the 800 level. A drift from the raise has been driven 40 feet on the ore, which continues in both faces and is considered a faulted continuation of the orebody mined in 1946 and 1947 above the 800 level. The mine superintendent has reported that diamond drilling operations have revealed what is believed to be a continuation of the ore 125 feet west of the raise. Meanwhile, the company has extended the vertical shaft from the 1000 to the 1200 level where a pocket is being cut to facilitate mining the ore above 1200. A winze has been sunk on ore 140 feet to the 1300 level where a pocket is being cut for development ore from drifting on the 1300 level. Also, plans are being discussed for increasing mill capacity from 3,000 to 4,000 tons monthly.

The 100-foot Guy Riegel mine shaft will be unwatered by Northwest Leasing Company of Kellogg, Idaho, which will mine at that depth. The mine is 15 miles north of Bonners Ferry and the company took a lease and option on it from Silver Bowl, Inc., last fall, mining from shallow surface workings. Ore was milled in the 100-ton flotation mill on the property and three shipments of lead-zinc concentrates were shipped before operations were suspended in December because of heavy snows. John R. Reynolds, Kenneth Preston and James J. Snider of Kellogg and Paul Crawford of Sandpoint are partners in Northwest Leasing.

Jack Etherton and Walter Smittroth of Kellogg, Idaho, have taken a three-year lease on a group of claims owned by the Big It Mining and Milling Company in the Trapper Creek district of Pine Creek. Several small shipments of tungsten ore have been made from the property in the past by lessees.

The Lucky Friday Silver-Lead Mines Company reported a record mill run at the end of April. A net of \$180,000 in smelter returns from milling 10,125 tons of ore was estimated. Two cars of zinc

concentrates and 12 cars of lead concentrates were recovered from the run. Returns for the first four cars amounted to about \$14,500 per car.

The chimney-shaped orebody being mined by the Coeur d'Alene Mines Corporation in the American Silver-Silver Standard boundary area near Osburn, Idaho, has been followed 105 feet upward and is both widening and lengthening, although the 14-foot average width now being encountered has more waste in the middle. Mill heads were reported to be averaging 15 to 19 ounces of silver per ton.

RALPH W. NEYMAN has been named manager and vice president of the Silver Summit Mining Company. He had been general superintendent and succeeds L. E. Hanley, who is president of Hecla and Polaris Mining Companies.



The mines are all in the Wallace area of Idaho. Re-elected president of Silver Summit was Harry P. Pearson.

General Mines Corporation plans to diamond drill from the bottom of its 200-foot shaft, according to H. G. Loop, president, in order to explore ground adjoining the Page mine where a large orebody is now being developed. The mines are west of Kellogg, Idaho, on Little Pine Creek. General Mines recently added some new equipment including a pump and ore cars and is mining from a raise off the main level adit.

To convert its No. 4 service and ore transfer winze to a two-compartment service shaft, Sunshine Mining Company is sinking 100 feet below the 3,700 level to make sump and pocket room. The recently enlarged station on the 3100 level has been equipped with a more powerful hoist. The new facilities will permit the company to carry out its underground ore separation system better, below the 3100 level. At present silver-copper-antimony ores are hoisted through the Nos. 2 and 3 shafts which go down to the 3100 level only. Silver-lead ores are hoisted through the main Jewell shaft.

Clayton Silver Mines, Clayton, Idaho, recently bought two 100-hp. Diesels to provide sufficient power to open another level and reserve power against possible failure of present units. The company also is adding three flotation cells to the zinc circuit in the mill and one to the lead circuit. The proposed shaft sinking to open a new level will probably not begin until summer and will not be finished until next year. The company also is considering the resumption of exploration and development of the Ella group, which if done will need the backing of Federal funds. Extension of the

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The Bismarck Mining Company has encountered in a drift on the Bismarck vein an orebody containing lead-copper-silver. Mineralization in the Bismarck vein has been fairly good for some time but was widely disseminated over a 12 to 14 foot width. The present find is in narrow section of about four feet in width and has resulted in a more valuable concentration.

The Westvaco Chemical Division, Food Machinery and Chemical Corporation, Pocatello, Idaho, has been awarded a 50 percent certified amortization on a \$9,000,000 plant over a five-year period by the Defense Production Authority.

The construction of the proposed Hells Canyon dam on Snake River, between Idaho and Oregon, would prove a mixed blessing to the Red Ledge, Inc. The dam would provide cheap power immediately below the copper mine's property and cheap water transportation to the railroad at Weiser, 90 miles away, eliminating the present difficult truck route. However, raising the river level would affect the main tunnel, the mill, the compressor, bunk house, mess hall and machine shop, all of which would have to be moved to a higher level. The change also would involve driving a new crosscut and sinking a shaft with a hoist, hitherto unneeded. Red Ledge owns 80 unpatented claims in the area. Officers are Eill Simons, president, and Kaytor Hoppenyan, general manager.

MONTANA

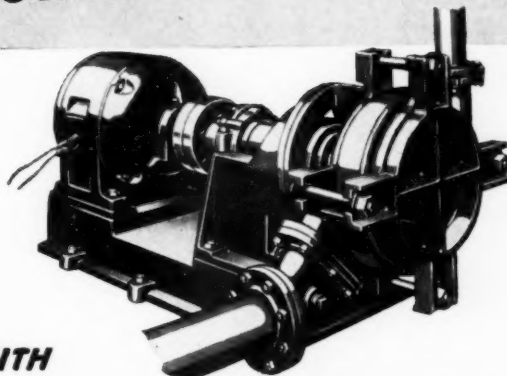
Sixty tons of uranium ore, containing pitchblende, autunite, and metatorbernite were recently shipped from the Free Enterprise mine of the Elkhorn Mining Company near Boulder, Montana. This was the sixth shipment of its kind. Five men are mining and stoping ore at the property, while another crew is preparing the Elkhorn mine itself for examination.

Full scale operation is contemplated for the Crystal mine, near Basin, Montana, after road work is completed. A small crew is on the property readying the mine.

Ambassador Mines Corporation is resuming operation of its Trout Creek district, Montana, property, closed down during the winter. M. J. Unger, president, and John R. Cross, director, recently visited the property to line up supplies and operating plans. The company expects to extend the main adit 100 feet to reach the projected extension of the Wanda vein, containing gold, silver, copper and lead ore.

A resumption of exploration work at Carbonate Mines, Inc.'s property near Marysville, Montana, is planned by King of Pine Creek Mining Company, preceded by a surface diamond drilling program. W. T. Anderson, director of King, and R. R. Weideman, mine manager of Silver Dollar Mining Company, visited the Carbonate property recently to lay out the drilling program. (Silver Dollar and New Jersey Lead Company share an interest in Carbonate Mines with King of Pine Creek.) The Bald Butte mine, which adjoins the Carbonate

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mine and is also part of the property, was not mentioned in exploratory plans. Both mines contain lead-gold-silver.

Mining at a rate of about 40 tons a day, *Nancy Lee Mines, Inc.*, Superior, Montana, has taken over 500 tons of development ore from the silver-lead-zinc vein discovered a short time ago. The company is completing milling of tailing and the newly mined ore will soon be run through the 125-ton mill on a two-shift basis with Jake Shoder as advisor in connection with milling and metallurgical problems. The company has driven two crosscuts the width of the 20-foot vein, and a raise is being started about 80 feet along in the drift to the upper level of the mine—a distance of about 175 feet.

OREGON

The *Tyrrell Manganese Company* has been organized by Lester L. Sibley of Medford, Oregon, and will reopen the *Tyrrell manganese mine* east of Medford in the Lake Creek region. The company is considering the installation of a 50-ton concentrator for its own and custom milling.

Test-shaft sinking and churn drilling are in progress at *The M. A. Hanna Company's* nickel property on Nickel

Mountain, Riddle, Douglas County, Oregon. The *C. Kirk Hillman Company* of Seattle is doing the drilling with two rigs.

The *Liberty tremolite asbestos mine* on Cedar Springs Mountain, northern Jackson County, Oregon, has been leased by H. L. Wadell of Grants Pass. He will operate the mine under the name of *Oregon Asbestos and Mining Company*.

Placer operations are being conducted on lower Conner Creek, Baker County, Oregon, by the *Pedro Brothers*.

WASHINGTON

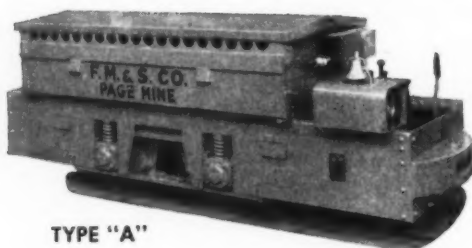
The *Hoover lead-silver mine* north of Newport, Washington, is being reopened for operation by the *Newport Mining and Leasing Company*, newly incorporated by Harry E. Scott and Roy Lance of Metaline Falls, Lloyd Ek of Ione, and Paul A. Culver of Spokane. The company acquired the properties formerly operated by *Hoover Mining Company* and began rehabilitating tunnels and shafts several months ago.

Germania Consolidated Mines, Inc., of Spokane, has completed installation of a new Diesel power plant at its Stevens County property, Washington. According to H. W. Traver, operations manager, about 100 feet of stope had been drilled and blasted at the first of April and the initial shipment of tungsten concentrates (wolframite) was sent in the middle of May. The property was reopened at the first of March.

The Northwest Mining Association has moved to new and larger quarters at West 522 First, Spokane, Washington, according to David E. Watson, first vice president. The Association had been at the old location, West 512 First, for 15 years.

The *Sunny Peak Mining Company* has completed cleaning and retimbering the adit in the *Mohawk mine* near Conconully, Okonagon County, Washington, and has laid new track from the portal in for a distance of 450 feet at which point contact has been made with a silver-bearing vein which also contains copper and lead. At the company's nearby Gubser mine, the adit is in over 880 feet and is estimated to be 100 feet from the ore-body. Charles J. Weller is president.

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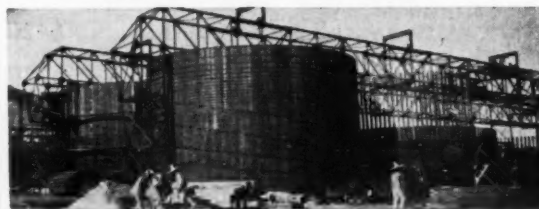
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Pickands Mather Opens Zimmerman Mine

The Zimmerman mine at Gastra, Michigan, has been reopened after a two-year suspension of operations, according to Harold J. Richards of Caspian, Michigan, general superintendent of Pickands Mather & Company's mines on the Menominee range.

Production has already begun and about 92 men are employed. Richards advised that all the company's mines are now on a six-day working schedule again.

Lakes Shipping Season Gets Under Way

On April 11 the Head-of-the-Lakes ore shipping season for 1951 opened when five Pittsburgh Steamship Company vessels carrying about 63,000 gross tons of Minnesota iron ore cleared Duluth and Two Harbors, Minnesota, and headed for lower lake ports.

According to W. C. Hemingway, president of the U. S. Steel subsidiary, 42 of the company's fleet of 61 vessels were in operation the first day, three weeks ahead of the opening of the 1950 season, and the remainder of the vessels were in operation by the end of the month.

Meanwhile, R. T. Elstad, president of Oliver Iron Mining Company, another U. S. Steel subsidiary, advised that all-rail shipments of iron ore from the company's properties to Eastern steel mills would continue this season to augment vessel shipments. About 400 to 500 cars a day are scheduled. Last season the mines on the Menominee range shipped about 1,000,000 tons of iron ore all-rail.



A crushing plant will be built at the St. James mine at Aurora, Minnesota, on the Mesabi. The construction was authorized by Oglebay Norton and Company, which manages the St. James Mining Company.

The first commercial attempt to produce marketable concentrates from low-grade reserves on the western Michigan ranges will be made by the Hanna Coal and Ore Company near Randville, northern Dickinson County. A \$75,000 pilot plant for experimentation into possible commercial beneficiation of low-grade ore (about 30 percent iron content) is to be installed. The plant is expected to begin operating late this summer.

The Cleveland Cliffs Iron Company's Negaunee mine, Marquette range, Michigan, which was exhausted in 1949, is to be connected underground with the adjacent Athens mine. The company is deepening the Negaunee shaft to supplement hoisting facilities at the latter property.

The Junior Mining Company, which plans to strip the Haley mine on and under the Longyear Lake at Chisholm, Minnesota, has met with opposition from a group of Chisholm property owners. A hearing on the application for a permit to mine was held by the Minnesota conservation commission and city and company representatives on May 17 to come to an agreement on the difficulties. No report on the results has yet been made.

To be ready for the beginning of the shipping season which opened April 11, mines began loading ore cars as early as April 6 and by April 20 almost all mines in the Minnesota iron country were shipping. The Oliver Iron Mining Company began loading from the Hull-Rust-Sellers mine on April 6 and from the Sherman mine on April 7. Pickands Mather and Company began loading at the Mahoning mine near Hibbing on April 9. The M. A. Hanna Company began loading from mines in the Missis-

sippi group in the Keewatin area on April 9. All companies are working on a full production schedule for this season and operations are being expanded as fast as shipping facilities permit.

The keel for a new Cleveland-Cliffs Iron Company ore carrier will be laid soon at the Toledo, Ohio, shipyard of the American Shipbuilding Company. The new ore boat, as is true of several of the recent additions to the Great Lakes fleet, will be an oil burner. The boat will have an over-all length of 647 feet, a beam of 70 feet, a depth of 36 feet and, with a 25-foot draft, her capacity will be 20,000 gross tons. Delivery is scheduled for early 1952. The name for the new ore carrier will be Edward B. Green, according to Alexander Brown, president of C-C-I. Mr. Green is chairman of the board of directors for the iron company and was president of C-C-I in 1933.

The M. A. Hanna Company has closed

Continued on Page 88



DIZZY WORK IN A SANDSTONE QUARRY

At South Amherst, Ohio, the Cleveland Quarries Company owns 883 acres of quarry land with six operating quarries, recovering Berea sandstone. Quarry No. 6 has produced about 455,000,000 cubic feet of sandstone in the past 100-odd years. The Buckeye, another of the quarries and said to be the deepest known in the world, measures 230 feet deep, 1,800 feet long and 600 feet wide. Working at dizzying height on the top of the sandstone plateau in the picture can be seen an International Harvester Company TD-9 crawler tractor. In Cleveland Quarries' two gangsaw mills about 4,600 cubic feet of sawed stone is produced daily.

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LEAD:	Common Grade. New York	17.00c
	Foreign Lead. New York, duty paid	22.50c
ZINC:	Prime Western. East St. Louis	17.30c
ALUMINUM:	Primary 30 pound Ingots (99% plus). F.o.b. shipping points	19.00c
ANTIMONY:	Bradley Mining Co.'s Elk Brand 99.5%. F.o.b. Cascade, Idaho	50.00c
	Lone Star Brand. F.o.b. Laredo, in bulk	42.50c
COBALT:	97-99%, keg of 550 pounds	\$2.10
MAGNESIUM:	Ingots (99.8%). F.o.b. Freeport, Texas	24.50c
MERCURY:	Flasks. Large lots, New York	\$215.00
NICKEL:	"F" Ingots (5 pounds). F.o.b. refinery, Port Colborne, Ontario	51.00c
TIN:	Grade A Brands. New York	139.00c
TITANIUM:	(98.5%). F.o.b. Beverly, Massachusetts	\$7.00
GOLD:	United States Treasury price	\$35.00 per ounce
SILVER:	Newly mined domestic. United States Treasury price	90 1/2c per ounce
	Foreign. Handy & Harman	90.16c per ounce
PLATINUM:		\$90.00-\$93.00 per ounce

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	Turkish. 48% Cr ₂ O ₃ . 3 to 1 chrome-iron ratio	\$48.00-\$49.00
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports.	
	Mesabi, Non Bessemer, 51.5% Fe	\$8.30
	Mesabi, Bessemer, 51.5% Fe	\$8.45
	Old Range, Non Bessemer	\$8.55
	Old Range, Bessemer	\$8.70
MANGANESE ORE:	Metallurgical grade. 46% Mn. Long ton unit	\$1.05
	Chemical grade. 80% MnO ₂ . Per ton	\$60.00
	Chemical grade, domestic, 70% MnO ₂ , F.o.b. mines	\$45.00
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TUNGSTEN CONCENTRATE:	60% WO ₃ . Per short ton unit	\$65.00
URANIUM ORE:	Carnotite-Roscoelite. F.o.b. purchase depot plus \$0.06 per ton mile (maximum of \$6.00), Rifle, Naturita, Uravan and Durango, Colorado, and Monticello, Utah. Base price for 0.10% ore is \$1.50 per pound and ranges to \$3.50 per pound of contained U ₃ O ₈ plus \$0.75 per pound for each pound in excess of four pounds per short dry ton and an extra allowance of \$0.25 per pound for each pound in excess of 10 pounds. A development allowance of \$0.50 per pound is paid for all ores purchased.	
VANADIUM ORE:	Carnotite-Roscoelite. V ₂ O ₅ content, up to 10 pounds, in uranium ore paid for at \$0.31 per pound in ratio of 10 parts V ₂ O ₅ to 1 part U ₃ O ₈ .	

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	Ceramic grade. Minimum CaF ₂ content, 95%	\$45.00
	Acid grade. 97% CaF ₂	\$50.00
PERLITE:	Crude. F.o.b. mine per short ton	\$3.00 to \$5.00
	Plaster grades. Crushed and sized. F.o.b. plants per short ton	\$7.00 to \$9.00
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Continued from Page 85

its Duluth, Minnesota, mining office and R. C. Fish, general manager, has transferred his headquarters to the Cleveland, Ohio main office. Mining transactions formerly handled by the Duluth office are being handled by R. W. Whitney, general manager of Minnesota operations, at the Hibbing, Minnesota, office.

The Mahoning mine operated by Pickands Mather and Company at Hibbing, Minnesota, was presented an award by the National Safety Council for outstanding safety performance during 1949 and 1950. Presentation was made on April 19 by Dr. Karl Nolte, representative of the NSC for the area.

The Inter-State Iron Company will soon begin stripping at its Pettit mine at Gilbert, Minnesota. A six-cubic-yard electric shovel, three tractor-drawn scraper units, nine 34-ton Euclid trucks, three bulldozers, a road grader and a truck crane constitute the chief items of equipment for the mine, much of which has already been delivered. A large truck garage and a new office building will be constructed this summer. The Pettit adjoins the Schley which Inter-State also operates and which will enter the shipping list this season. The Pettit is expected to produce ore in 1954. It contains an estimated tonnage of 3,367,000 tons and was operated by Republic Steel Corporation as an underground mine from 1902 to 1923. Three hundred acres of land have been acquired by Inter-State adjacent to the Pettit-Schley-Hobart group for the disposal of stripping, lean ore and taconite. Nearly 12,000,000 cubic yards of stripping will eventually be moved from the Pettit pit and about 8,000,000 yards

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of this must be removed to produce the first season's ore. The Pettit will employ about 114 men.



Field engineers of the U. S. Bureau of Mines will resume investigations of manganese deposits in Aroostook County, Maine, this summer. Although reserves are very large and a substantial tonnage can be mined by low-cost openpit methods, the ore is complex and presents a difficult metallurgical problem. The Bureau is conducting metallurgical research on the ore to determine the most suitable process for recovery of the manganese in a ferro-grade product. Professor A. M. Gaudin of the Massachusetts Institute of Technology, who studied the area last year, said the deposits might contain 200,000,000 tons of ore of 5 to 10 percent manganese and 10 to 30 percent iron.

Among companies recently receiving certificates of necessity from the Defense Production Administration for new defense facilities are the St. Joseph Lead Company, The Foote Mineral Company, The Aluminum Company of America, and the National Gypsum Company. The St. Joseph Lead Company applied for \$1,468,070 for the expansion of slab zinc production facilities at its Joseptown, Pennsylvania, zinc refinery. All of the amount was considered eligible and 75 percent was certified as eligible for a five-year amortization. The Foote Mineral Company applied for \$56,855 for additional power facilities to produce tungsten, zirconium, and lithium products at its Exton, Pennsylvania, plant. The company was ruled eligible for \$54,855 and 85 percent was certified. The Aluminum Company of America applied for \$1,709,000 for facilities for primary aluminum production at Massena, New York, and was eligible for all with 95 percent certified. The National Gypsum Company applied for \$1,269,507 for pebble quick lime (fluxing and chemical) production facilities at Bellefonte, Pennsylvania, and was eligible for all with 75 percent certified.

The Vanadium Corporation of America has begun construction of a \$7,000,000 alloy production plant in Mason County, West Virginia, and is well under way on its \$1,500,000 program involving expansion, rehabilitation and modernization of its Niagara Falls, New York plant. The increased production from these facilities will be evident in 1952.

Tungsten Mining Corporation, which operates the Hamme mine in Vance County, North Carolina, has a contract with the government for the production of 600,000 short ton units of concentrates over a seven-year-period, starting on May 1, 1951. In line with this contract the company plans to expand mining and milling capacity from 300 to 500 tons of WO₃ ore daily, according to reports. All production will be sold in the open market to regular customers.

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- 1-25 1/2 Vulcan, single drum
- 1-Box I. Wks. Single Drum, direct geared to a 15 HP Slip-ring Motor
- 1-H&B Single Drum Converted, direct geared to a 25 HP Slip-ring Motor
- 1-Crow Converted Single Drum Friction direct geared to a 7 1/2 HP Slip-ring Motor

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- 1-6' x 22' Dorr Type Duplex Rake Classifier
- 1-60' x 23' Denver Equipment Simplex Crossflow, Spiral Classifier

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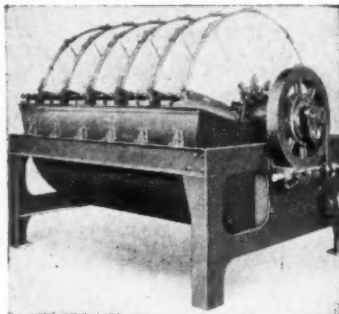
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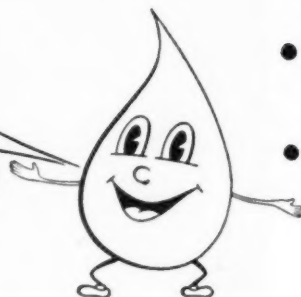
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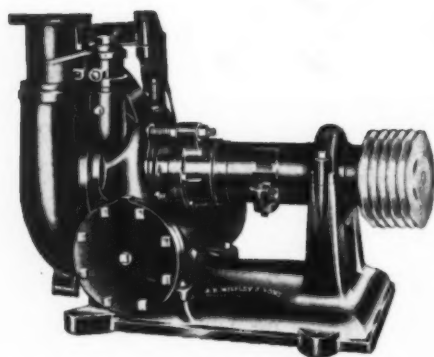
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